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ABSTRACT

This competency-based curriculum guide on the specialty area of bricklaying is part of the Introduction to Construction series. The series is designed with the flexible training requirements of open shop contractors, preapprenticeship programs, multicraft high school programs, technology education programs, and cooperative education programs in mind. This guide contains one section and four instructional units: bricklaying materials, bricklaying tools, bricklaying layout, and bricklaying basic skills. Eight basic components form a unit of instruction: performance objectives (unit and specific objectives), suggested activities for the teacher (an outline of unit contents and an instructor's guide), information sheets, assignment sheets, job sheets, transparency masters and supplements, tests, and answers to tests and assignment sheets. (YLB)

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Introduction to Bricklaying



instructor edition

Introduction to Construction Series

88-005722

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CE 051499

INTRODUCTION TO BRICKLAYING COMPETENCY PROFILE

Student _____ Soc. Sec. No. _____
Last First MI

PROGRAM _____	Grade 9 10 11 12 Adult _____	SCHOOL _____
INSTRUCTOR _____	SCHOOL ADDRESS _____	PHONE _____
STUDENT'S HOME ADDRESS _____	DATE OF BIRTH _____	PHONE _____
STUDENT'S EMPLOYER _____	ADDRESS _____	PHONE _____
CONTACT IN CASE OF EMERGENCY: _____		PHONE _____
ADDRESS _____		
OR _____		
ADDRESS _____		PHONE _____

The above information can be used for school records and/or to ensure safety of students. This confidential information is not to be released to employers or to the general public.

ON-JOB TRAINING/WORK EXPERIENCE

DURATION OF EMPLOYMENT	JOB TITLE	EMPLOYER	SUPERVISOR'S NAME	ADDRESS OF EMPLOYER	PHONE

This agency does not discriminate on the basis of race, creed, color, national origin, sex, age, veteran status, qualified handicap, or disability.

SPECIFIC JOB COMPETENCIES

Directions: Evaluate the trainee using the rating scale below and check the appropriate number to indicate the degree of competency achieved. The numerical ratings of 4, 3, 2, 1, and 0 are not intended to represent the traditional school grading system of A, B, C, D, and F. The descriptions associated with each of the numbers focus on level of student performance for each of the tasks listed below. The written test score line is provided for optional teacher use. It may not be applicable in all cases. "NA" is an appropriate entry in such instances.

- Rating Scale: 4 — Skilled — can perform independently with no additional training.
 3 — Moderately Skilled — has performed independently during training program, limited additional training may be required.
 2 — Limited Practice — has practiced during training program, additional training is required to develop skill.
 1 — Exposure Only — general information provided with no practice time, close supervision needed and additional training required.
 0 — No Exposure — no information nor practice provided during training program, complete training required.

4 3 2 1 0

☐ ☐ ☐ ☐ ☐

Bricklaying Materials

1. _____

WRITTEN TEST SCORE _____

4 3 2 1 0

☐ ☐ ☐ ☐ ☐

Bricklaying Tools

1. Hold a brick trowel correctly.

2. _____

WRITTEN TEST SCORE _____

4 3 2 1 0

☐ ☐ ☐ ☐ ☐

Bricklaying Layout

1. Use framing square to lay out an 8-inch wall corner.

2. Use a level.

3. Lay out a section of wall.

4. Lay out a section of wall containing openings.

5. _____

WRITTEN TEST SCORE _____

4 3 2 1 0

☐ ☐ ☐ ☐ ☐

Bricklaying Basic Skills

1. Measure, mark, and cut brick and block.

2. Spread mortar on a two-by-four.

3. Swipe mortar on a two-by-four for block.

4. Construct a section of wall.

5. Construct a section of wall with openings.

6. Lay block to established leads.

7. Build a 90-degree block lead.

8. Lay brick to established leads.

9. Build a 90-degree brick lead.

10. _____

WRITTEN TEST SCORE _____

Use of This Document

This document can be used to record information about the student and the skills mastered by the student. This information is useful in documenting student progress during the training program and to provide information about the student's qualifications to potential employers and for entry into advanced training programs. Instructors using AGC-CIMC instructional materials are authorized to reproduce this document as required for use in their training programs.

INTRODUCTION TO BRICKLAYING

Developed as a Cooperative Project by
The Associated General Contractors of America
William K. Healy, Chairman, Manpower and Training Committee
and
Oklahoma State Board of Vocational and Technical Education
John Folks, Chairman
Roy Peters, Jr., Director

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INTRODUCTION TO BRICKLAYING

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A more advanced curriculum on bricklaying is available from The Associated General Contractors of America, 1957 E Street, N.W., Washington DC 20006, phone (202) 393-2040 or contact the Oklahoma State Department of Vocational and Technical Education/Curriculum and Instructional Materials Center, 1500 West Seventh Avenue, Stillwater, Oklahoma 74074-4364.

FOREWORD

In 1985, The Associated General Contractors of America (AGC) met with representatives of the Oklahoma Curriculum and Instructional Materials Center (CIMC) to discuss the possibilities of developing, as a cooperative project, a course of instruction designed for training individuals who choose to seriously explore careers in construction.

This publication is the result of those original discussions and close coordination among general contractors and vocational educators. This series represents a conscious effort to coordinate the practical experience of personnel in the construction industry with the best instructional methods of those in the field of vocational education.

Although this series reflects a systematic approach to instructional materials development and the latest in educational technology innovations, the information in *Introduction to Bricklaying* should be adapted and modified to coincide with local conditions.

Roy Peters, Jr., Director
Oklahoma State Department of
Vocational and Technical Education

William K. Healy, Chairman
Manpower and Training Committee
The Associated General Contractors
of America

PREFACE

For many years The Associated General Contractors of America (AGC) has recognized the need for providing quality competency-based instructional materials for the construction industry. AGC and the Oklahoma State Department of Vocational and Technical Education have met this challenge by providing nationally recognized curriculum and services since 1972. In 1986 AGC and Oklahoma's Curriculum and Instructional Materials Center (CIMC) determined a significant need for a series that would address training needs of open shop contractors, preapprenticeship programs, multi-craft high school programs, technology educational programs, CVET, and cooperative education programs. The Introduction to Construction Series was designed with the flexible training requirements of these groups in mind.

The Introduction to Construction Series begins with *Fundamentals to Construction* and progresses to twelve spin-off specialty publications. *Fundamentals of Construction* covers basic knowledge necessary for all individuals to in construction. Each specialty area covers basic skills necessary for entry-level employment. Both vocational education and the construction industry offer more advanced courses in each specialty area and should be considered by individuals wishing to establish careers in the industry. Competency profiles (provided in the teacher edition) for the Introduction to Construction Series articulate with several more advanced AGC publications as well as publications developed by the Mid-America Vocational Curriculum Consortium (MAVCC).

Publications in this series include:

- Introduction to Bricklaying
- Introduction to Carpentry
- Introduction to Concrete Masonry
- Introduction to Ironwork
- Introduction to Electricity
- Introduction to Plumbing
- Introduction to Heating, Ventilation, and Air Conditioning
- Introduction to Sheet Metal
- Introduction to Roofing
- Introduction to Drywall
- Introduction to Insulation
- Introduction to Welding

USE OF THIS PUBLICATION

Instructional Units

Introduction to Bricklaying contains one section and four instructional units. A standard format was established in 1970 for development of instructional materials for all Oklahoma vocational teachers. This format includes eight basic components that form a unit of instruction: performance objectives, suggested activities for the teacher, information sheets, assignment sheets, job sheets, transparency masters and supplements, tests, and answers to tests and assignment sheets. Depending on the specific objectives, there may or may not be transparency masters, supplements, assignment sheets, or job sheets included in the unit of instruction.

All of the unit components "zero in" on measurable and observable learning outcomes. Teachers are encouraged to supplement, personalize, localize, and motivate with these materials in order to develop a complete teaching/learning process.

Units of instruction are designed for use in more than one lesson or class period of instruction. Careful study of each unit of instruction by the teacher will help him or her determine the following

- Amount of material that can be covered in each class period
- Skills that must be demonstrated
 - Supplies and equipment needed
 - Amount of practice needed
 - Amount of class time needed for demonstrations
- Supplementary materials, such as pamphlets and filmstrips, that must be ordered
- Resource people to contact

Performance Objectives (white pages)

Each unit of instruction is based on the performance needed for successful employment in an occupational area. Performance objectives are stated in two forms: unit objectives, stating the subject matter to be covered in a unit of instruction; and specific objectives, stating the performance necessary to reach the unit objective. Since the objectives of the unit provide direction for the teaching/learning process, it is important that teachers and students have a common understanding of the intent of the objectives.

The objective sheet should be given to students and referred to throughout the teaching/learning process. This will help answer any questions concerning performance requirements for each instructional unit. The objectives can also help determine teaching strategies and instructional methods. Prepare for each unit by deciding how each objective can best be taught.

The objective sheet may also be used as a quick pretest to determine students' prior knowledge and to determine whether further study or activities are necessary. Teachers should feel free to modify, delete, or add objectives in order to meet the needs of the students and community. When changes in objectives are made, the teacher should remember to supply the needed information, assignment and/or job sheets, and criterion test items.

Suggested Activities (pink pages)

Suggested activities are included only in teacher materials. The suggested activities pages include an outline of the unit contents and an instructor's guide designed to assist teachers in planning their presentation of the unit. The instructor's guide provides suggestions for delivery and/or presentation during the instructional process. Read the suggested activities before teaching the units so that supplemental materials can be obtained, audiovisual materials prepared, and outside resources contacted. Duties of the teacher will vary according to the particular unit.

The references that are listed in the suggested activities are ones used in the development of each unit. They may be used by the teacher to supplement her or his knowledge of the subject area or to help students with particular interests or occupational objectives in the area covered.

The suggested activities section of the unit also includes supplements and transparency masters. Each of these components provides information in a special way. Supplements may consist of motivational materials, review or practice materials such as crossword puzzles and self-tests, or charts and reference materials. Supplements are designed to be copied and distributed to individual class members or to the class as a whole. Suggestions for their use are included in the instructor's guide. Transparencies direct the class' attention to the topic of discussion. Transparencies may present new information, or they may reinforce information presented in the information sheet. They are particularly effective when identification or analysis is necessary. Order transparencies from the Curriculum and Instructional Materials Center, or make transparencies and place them in the notebook where they will be immediately available for use.

Information Sheet (green pages)

The information sheet provides "must know" content essential for meeting the cognitive (knowledge level) objectives of the unit. The information is written in a topical-outline form and is keyed to the specific objectives.

Teachers will find that the information sheet serves as an excellent guide for presenting background knowledge necessary to develop the skills specified in the unit objective. The information sheet may also be used for coordination activities and advisory committees.

Students should read the information sheet before the information is discussed in class. Space is provided in margins for students and teachers to add notes that supplement, localize, personalize, or provide motivation for each unit.

Assignment Sheets (brown pages)

Assignment sheets give students a chance at problem solving, self-assessment, and/or practical experience. They assist students in the application of knowledges that are necessary prerequisites to skill development. Assignment sheets may be given to the student for completion in class or may be used for homework assignments. Answer sheets are provided

when appropriate and can be used by the student and/or teacher for checking student progress. The scores of those assignment sheets listed in the specific objectives should be averaged with the unit test score, as the skills addressed in these assignment sheets are considered necessary in meeting the unit objective.

Job Sheets (blue pages)

Job sheets are another important segment of a unit of instruction. The job sheets provide a list of equipment, tools, and materials needed to complete a manipulative or psychomotor skill. They describe a step-by-step procedure needed to complete each task or job. Diagrams, photographs, and illustrations are provided to assist students in achieving the skill.

The teacher should demonstrate to students the procedures outlined in each job sheet. Furthermore, the teacher needs to localize the job sheet according to the equipment and supplies available in the local lab or shop situation. Job sheets also furnish potential employers with a picture of the skills being taught and the performances they might reasonably expect from a person who has had this vocational instruction.

Job sheet performance should be evaluated by the instructor and averaged with the unit test score, as the skills addressed in the job sheets are considered necessary in meeting the unit objective.

Tests (yellow pages)

The test provides criterion-referenced evaluation of every objective listed in the unit of instruction. It is crucial to note that both paper/pencil and performance objectives must be evaluated.

It is recommended that the tests be divided into shorter tests covering three or four objectives at a time and given soon after those objectives have been covered. A selection of questions from the units covered may be used for final tests at the end of each term if desired. If objectives have been added, deleted, or modified, be sure to make the changes on the test.

The acceptable response on a unit test, 85 percent in most units, may be raised or lowered to fit the topic or students' ability levels. The percentage applies to the overall score, not to each question. The final unit grade should be obtained by using the paper/pencil score and evaluations of student demonstrations of the desired skills.

Answers to Test and Assignment Sheets (pink pages)

Answers to test and assignment sheets are components designed to assist the teacher in evaluation of student performances.

Page Numbering

Each publication from the Curriculum and Instructional Materials Center (CIMC) is assigned a specific abbreviation. For example, *Introduction to Bricklaying* has been abbreviated ITB. The units are then numbered consecutively within each section. An example of a page number is ITB-1. Since CIMC publications are loose leaf, this system of page numbering was adopted so that pages from different manuals would not get mixed up.

Methods of Disseminating Material

For best results, provide student materials for each student. Student materials contain everything but the test, supplements, answers to assignment sheets, and suggested activities.

Teaching Methods

It is a challenge to keep students motivated. Supplement the objectives by providing the "why," personal experiences, and current information. Prepare for each unit by deciding how each objective can best be taught. Allow students to become involved in preparing and planning.

Competency Profiles

Competency profiles are folders used to document student performance. The profile contains a list of the specific job competencies that a student should achieve prior to leaving the training program. A competency profile master is provided in the instructor edition of each publication. Duplicate the profile and distribute to students as required.

Other AGC Publications: AGC updates curriculum products on a continuing basis. For a free catalog describing other AGC products, call the AGC National office at 1-202-393-2040.

CORRECTIONS AND SUGGESTIONS

The Curriculum and Instructional Materials Center (CIMC) wants to provide vocational instructors and students with materials that are accurate and effective. Although the CIMC strives to maintain the highest standards of development and production, oversights occasionally do occur. If you find any errors in this or other CIMC publications, or have suggestions for improving their usefulness in vocational programs, please notify the CIMC staff. One easy way of pointing out errors is to make a photocopy of the affected page and to indicate the correction on the copy. You can mail the information to the CIMC, where it will be used to correct the publication before the materials are reprinted.

To ensure that the material is updated on a timely basis, it is important that you notify the (CIMC) of necessary corrections as soon as possible after discovering the error. Do not assume that someone else will notice the error and inform the CIMC; other users may be making the same assumption. Please send corrections and recommendations for improving this publication to the following address:

Coordinator for Curriculum Development
Curriculum and Instructional Materials Center
Oklahoma State Department of Vocational and
Technical Education
1500 West Seventh Avenue
Stillwater, Oklahoma 74074

BRICKLAYING MATERIALS
UNIT I

UNIT OBJECTIVE

After completing this unit, the student should be able to identify different types of bricks and blocks, and match bond types to their meanings. The student will show this ability by completing the unit test with a minimum score of 80 percent.

SPECIFIC OBJECTIVES

After completing this unit, the student should be able to

1. Match terms associated with bricklaying materials to their definitions.
2. Name types of brick.
3. Match brick sizes to their correct names.
4. State factors to consider when selecting brick.
5. Label a brick, using the correct nomenclature.
6. Identify brick positions as they appear in a wall.
7. Describe absorption characteristics of hard and soft brick.
8. State important properties of brick.
9. Distinguish among types of bonds.
10. Label basic structural bonds.
11. Identify common concrete masonry units.
12. Select from a list sizes of most commonly used concrete masonry units.
13. Label a block, using the correct nomenclature.
14. Identify types of sills.
15. Identify types of lintels.
16. Match terms associated with mortars to their definitions.
17. List ingredients used in mortars.
18. Match types of mortars to their recommended uses.
19. State the purposes of mortar.
20. Match types of admixtures used in mortar to their results.



BRICKLAYING MATERIALS
UNIT I

SUGGESTED ACTIVITIES

I. Unit contents

- A. Objective sheet
- B. Suggested activities
- C. Information sheet
- D. Test
- E. Answers to test

II. Instructor's guide

- A. Review unit and plan presentation.
- B. Obtain samples of various materials outlined in this unit.
- C. Introduce unit to students.
 - Discuss the various types and sizes of brick, concrete masonry units, sills, and lintels.
 - Discuss mortars and types of ingredients used in mortars.
 - Discuss types of admixtures.
 - Discuss types of bonds.
- D. Provide students with objective sheet, and discuss objective sheet.
- E. Provide students with information sheet.
 - 1. Use Information Sheet, Section I, to discuss terms and definitions associated with bricklaying materials.
 - Point out the importance of knowing the definitions of these terms and how knowing them will help students to understand this and other units in this series better.



SUGGESTED ACTIVITIES

- Explain that the nominal size is the working size, which includes an allowance for mortar.
2. Use Information Sheet, Sections II and III, to discuss types and sizes of bricks.
 - Show students examples of the various types and sizes of bricks.
 - Have students identify the various sizes.
 3. Use Information Sheet, Section IV, to discuss factors to consider when selecting brick.
 - Discuss the importance of choosing the right brick for the job.
 - Ask the students to think of other factors that may not have been mentioned.
 4. Use Information Sheet, Section V, to discuss the correct nomenclature of brick.
 - Point out the different parts of a brick, and have students identify them.
 5. Use Information Sheet, Section VI, to discuss brick positions in a wall.
 - Have students review the information. Have one student lay up dry brick in one of the positions, and have another student give the correct name of the position. Continue doing this with other students until all students can lay up dry brick properly and give the correct names.
 6. Use Information Sheet, Section VII, to discuss absorption characteristics of hard and soft brick.
 - Demonstrate how different bricks absorb water by placing them in a container of water and timing them.
 7. Use Information Sheet, Section VIII, to discuss important properties of brick.
 - Have students give their opinions on why these properties are important.
 8. Use Information Sheet, Sections IX and X, to discuss types of bonds used in brick work.
 - Lay up dry bonds, and have students identify them; then have each student lay up the different bonds.

SUGGESTED ACTIVITIES

9. Use Information Sheet, Sections XI and XII, to discuss common concrete masonry units and sizes of the most commonly used concrete units.
 - Show students examples of the various types and sizes of concrete masonry units.
 - Have students identify the various types.
 - Discuss nominal and actual sizes of concrete units and why they use actual sizes instead of nominal sizes.
 - Discuss where the various types of masonry units are used.
10. Use Information Sheet, Section XIII, to discuss the correct nomenclature of blocks.
 - Point out the different parts of a block and have students identify them.
11. Use Information Sheet, Section XIV, to discuss types of sills.
 - Show students examples of the various types of sills.
 - Discuss the various types. Have students identify them and then explain where and why they are used for particular jobs.
12. Use Information Sheet, Section XV, to discuss types of lintels.
 - Show students examples of the various types of lintels.
 - Discuss the various types. Have students identify them and explain where and why they are used for particular jobs.
13. Use Information Sheet, Section XVI, to discuss terms and definitions associated with mortars.
 - Show examples of as many of the terms as is appropriate.
 - Discuss the terms and definitions. Explain how knowing these terms will help the students to better understand this and other units in this series.
14. Use Information Sheet, Section XVII, to discuss ingredients used in mortar.
 - Show students samples of the various ingredients used in mortar.
 - Explain the purpose of using these ingredients.
15. Use Information Sheet, Sections XVIII and XIX, to discuss recommended uses and the purposes of mortar.
16. Use Information Sheet, Section XX, to discuss the various types of admixtures used in mortar.
 - Discuss the different types of admixtures, their purposes and results.



SUGGESTED ACTIVITIES

- Discuss the results of using too much of a particular admixture and the results of using too little.

17. Take students on a field trip to a construction site. Have each of them make a list of all the items they see on the job that have been discussed in this unit.

F. Give test.

G. Critique test and discuss in class.

H. Reteach and retest as necessary.

I. Complete appropriate sections of competency profiles.

(NOTE: A master of the competency profile for this book is provided at the front of the instructor edition. You may duplicate the profile and distribute it to students as needed.)

- III. Unit reference — Hendrix, Laborn J. "Bud." *Bricklaying Curriculum—Principles of Bricklaying*. Stillwater, Oklahoma: State Department of Vocational and Technical Education/Curriculum and Instructional Materials Center, and The Associated General Contractors of America, 1984.

BRICKLAYING MATERIALS
UNIT I

INFORMATION SHEET

I. Terms and definitions associated with bricklaying materials

- A. **Absorption rate** — Weight or amount of water a masonry unit absorbs at certain conditions for a stated length of time
- B. **Adhesion** — Ability of mortar to stick to masonry unit
- C. **Compressive strength** — Brick's resistance to increasing loads or stress placed on it before it breaks
- D. **Dimensions** — Measurements or sizes
- E. **Durability** — Ability to withstand wear, abrasion, and weathering
- F. **Modular** — Refers to standardized units or dimensions for flexibility and variety in use
- G. **Mortar bond** — Adhesion of mortar to masonry unit, wall ties, or other reinforcement
- H. **Nomenclature** — Standardized names of portions or segments of a masonry unit
- I. **Nonmodular** — Refers to variations in size of standard brick and oversize brick
- J. **Pattern bond** — Arrangement of masonry units to form a pattern, design, or texture
- K. **Setting time** — Length of time required for mortar to harden enough to sustain the weight of masonry set on top of it
- L. **Structural bond** — Arrangement in which individual units are interlocked or tied together to distribute weight of wall
- M. **Texture** — Arrangement of particles of raw materials in brick; appearance and finish of a brick

II. Types of brick

(NOTE: There are many different kinds and sizes of brick available today, but there are only two main types.)

- A. Building brick
- B. Face brick



INFORMATION SHEET

III. Sizes of brick

(NOTE: Sizes given with the names are *nominal* dimensions; sizes given with the illustrations are *actual* dimensions.)

- A. Modular — 4" x 2 $\frac{2}{3}$ " x 8"
(Figure 1)

- B. Engineer — 4" x 3 $\frac{1}{5}$ " x 8"
(Figure 2)

- C. Norman 4" x 2 $\frac{2}{3}$ " x 12"
(Figure 3)

- D. Roman — 4" x 2" x 12"
(Figure 4)

EXAMPLES:

FIGURE 1

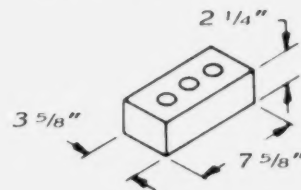


FIGURE 2

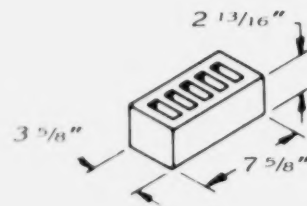


FIGURE 3

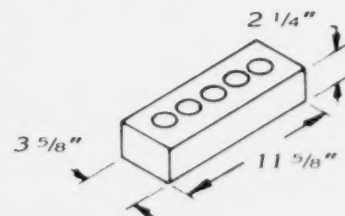
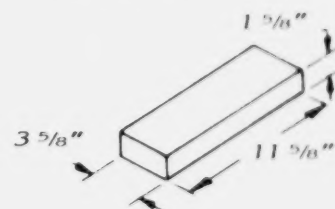


FIGURE 4



INFORMATION SHEET

E. Norwegian — $4" \times 3 \frac{1}{5}" \times 12"$
(Figure 5)

F. Oversize — $3 \frac{3}{4}" \times 2 \frac{3}{4}" \times 8"$
(Figure 6)

G. Economy 8 or jumbo closure —
 $4" \times 4" \times 8"$ (Figure 7)

H. Double — $4" \times 5 \frac{1}{3}" \times 8"$
(Figure 8)

EXAMPLES:

FIGURE 5

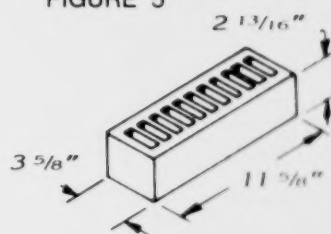


FIGURE 6

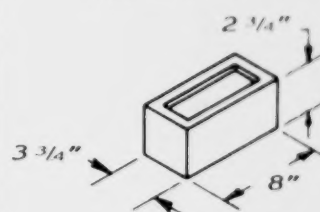


FIGURE 7

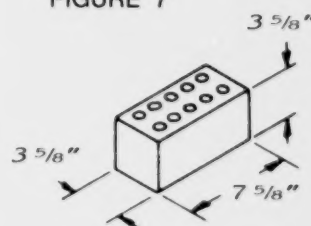
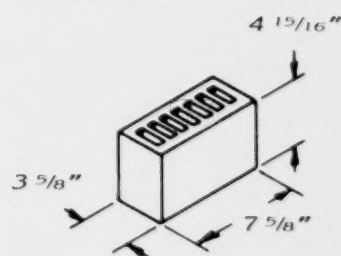


FIGURE 8



INFORMATION SHEET

- I. Economy 12 or jumbo utility —
4" x 4" x 12" (Figure 9)

- J. Triple — 4" x 5 1/3" x 12"
(Figure 10)

- K. SCR — 6" x 2 2/3" x 12"
(Figure 11)

- L. 6-inch Norwegian — 6" x 3 1/5" x 12"
(Figure 12)

EXAMPLES:

FIGURE 9

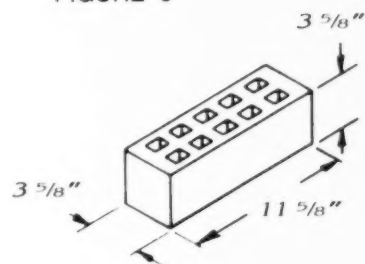


FIGURE 10

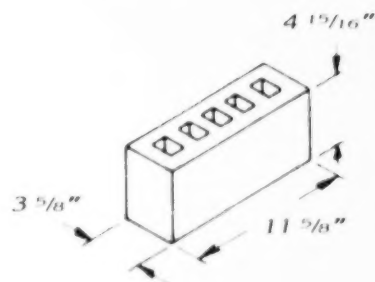


FIGURE 11

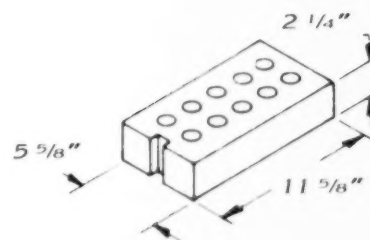
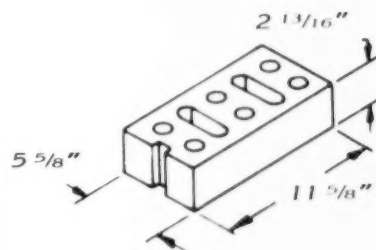


FIGURE 12



INFORMATION SHEET

M. 6-inch jumbo — 6" x 4" x 12"
(Figure 13)

N. 8-inch jumbo — 8" x 4" x 12"
(Figure 14)

O. 3-inch — 3" x 2 3/4" x 9 5/8"
(Figure 15)

P. Nonmodular — 3 3/4" x 2 1/4" x 8"
(Figure 16)

EXAMPLES:

FIGURE 13

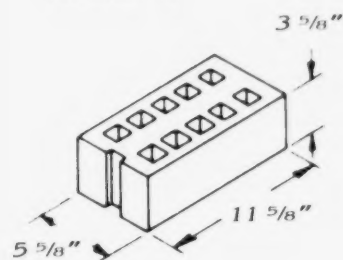


FIGURE 14

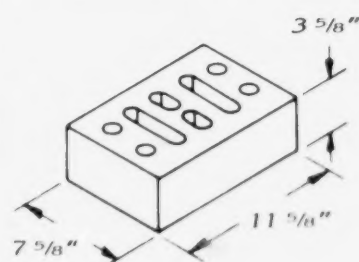


FIGURE 15

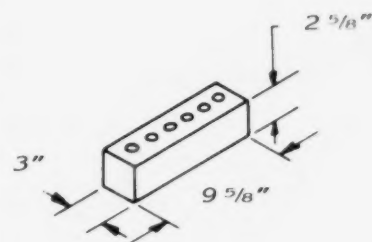
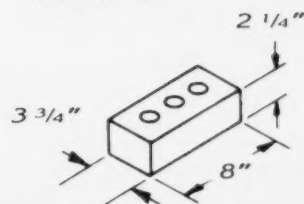


FIGURE 16



INFORMATION SHEET

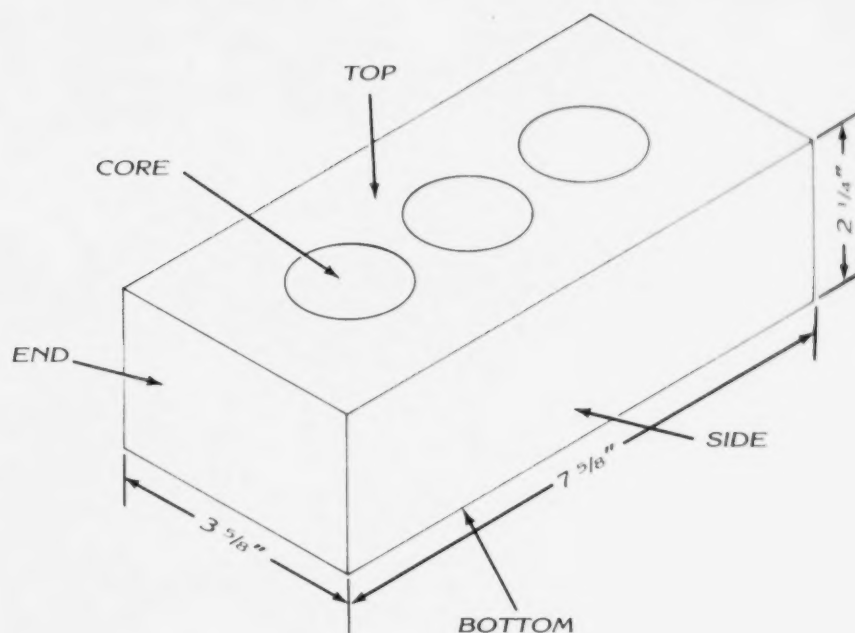
IV. Factors to consider when selecting brick

- A. Composition
- B. Manufacturing method
- C. Strength
- D. Appearance
- E. Color
- F. Special effects
- G. Economy

V. Brick nomenclature (Figure 17)

(NOTE: The face of a brick could be the top, side, or end, depending on the position of the brick in the wall.)

FIGURE 17

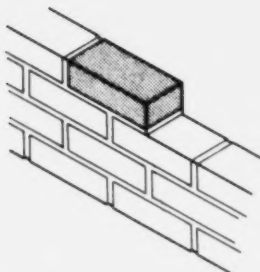


INFORMATION SHEET

VI. Brick positions (Figures 18-23)

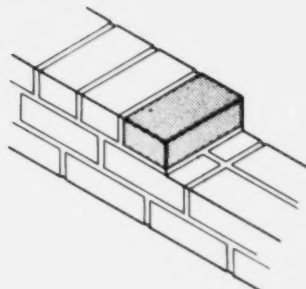
A. Stretcher

FIGURE 18



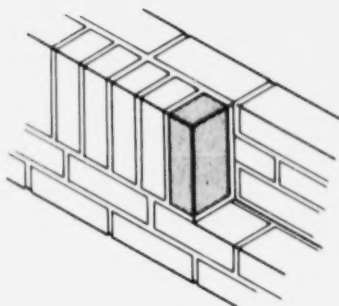
B. Header

FIGURE 19



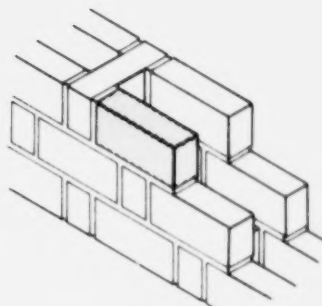
C. Soldier

FIGURE 20



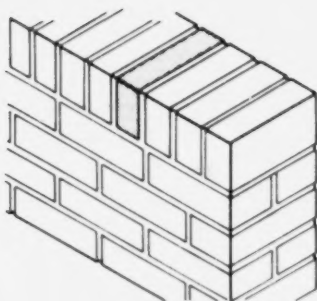
D. Shiner

FIGURE 21



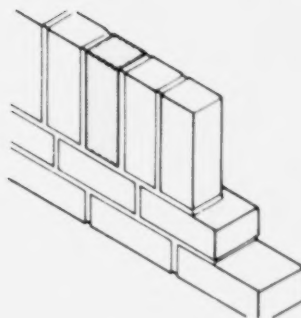
E. Rowlock

FIGURE 22



F. Sailor

FIGURE 23



INFORMATION SHEET

VII. Absorption characteristics of hard and soft brick

(NOTE: The rate of absorption [suction rate] of a brick partially immersed in water for one minute is important to a bricklayer. Knowing the effects of the absorption rate on mortar and bond helps identify setting time.)

A. Hard brick

1. Very dense
2. Low suction or absorption rate
3. Slow setting

B. Soft brick

1. Porous
2. High suction or absorption rate
3. Fast setting

VIII. Important properties of brick

- A. Color
- B. Texture
- C. Size variation
- D. Absorption rate
- E. Compressive strength
- F. Durability

IX. Types of bonds

(NOTE: All bonds should be structurally strong, provide good adhesion, and maintain the pattern or design specified.)

- A. Mortar bond — Adhesion of masonry unit with joint mortar
- B. Structural bond — Interlocking of masonry units with each other
- C. Pattern bond — Arrangement of masonry units to form a pattern or design

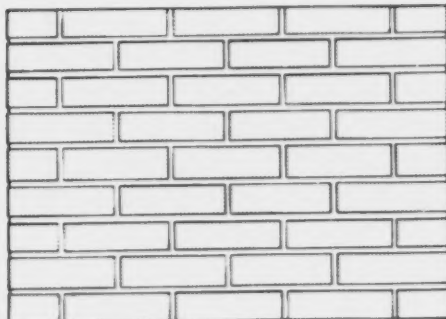
X. Basic structural bonds (Figures 24-28)

(NOTE: There are several variations of each of the basic structural bonds.)

INFORMATION SHEET

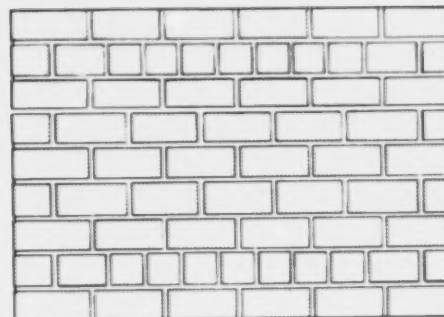
A. Running (stretcher)

FIGURE 24



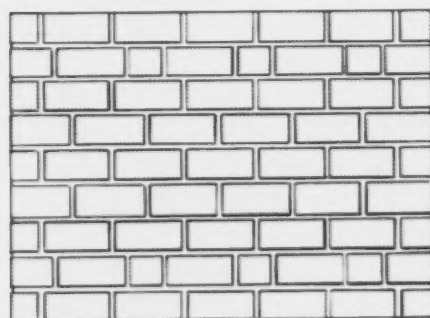
B. Common (American)

FIGURE 25



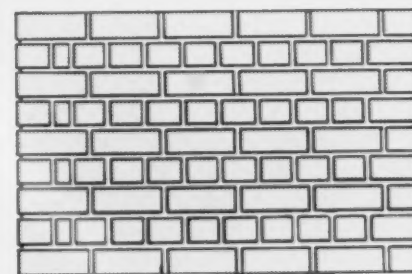
C. Flemish

FIGURE 26



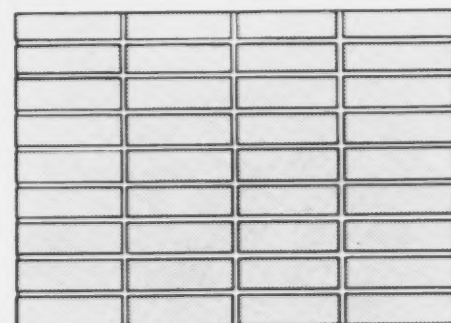
D. English

FIGURE 27



E. Stack

FIGURE 28

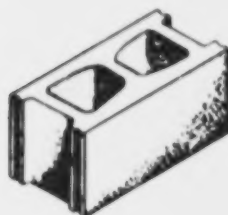


INFORMATION SHEET

XI. Common concrete masonry units (Figures 29-44)

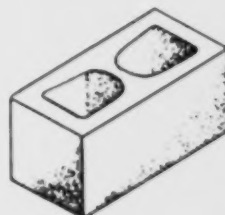
A. Stretcher

FIGURE 29



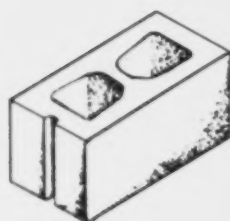
B. Corner

FIGURE 30



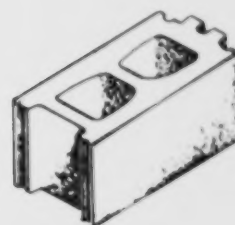
C. Jamb

FIGURE 31



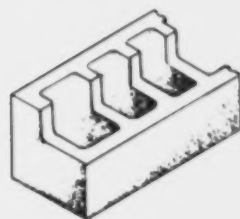
D. Control joint

FIGURE 32



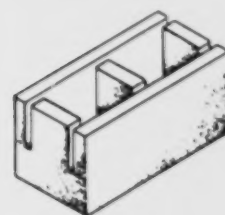
E. Header

FIGURE 33



F. Bond beam

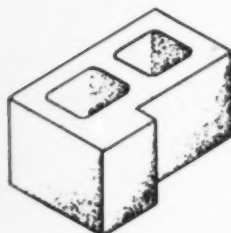
FIGURE 34



INFORMATION SHEET

G. Return corner

FIGURE 35



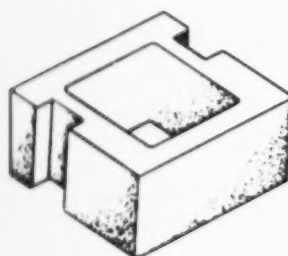
H. Sound absorbing

FIGURE 36



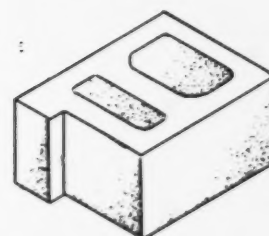
I. Pilaster

FIGURE 37



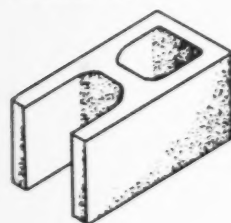
J. Combination jamb

FIGURE 38



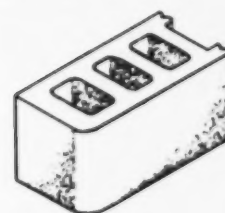
K. Conduit

FIGURE 39



L. Bullnose

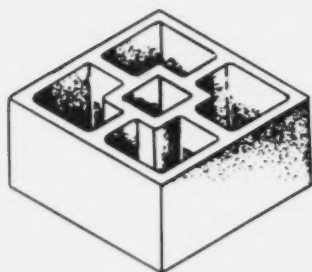
FIGURE 40



INFORMATION SHEET

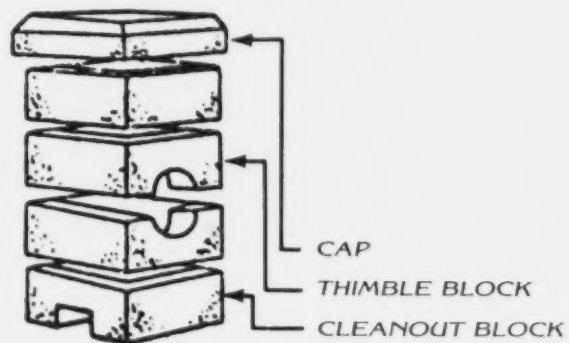
M. Ornamental

FIGURE 41



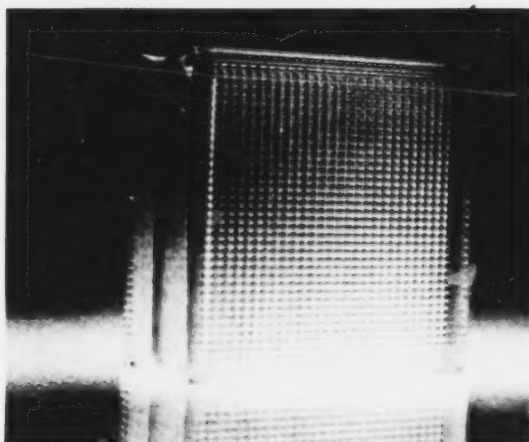
N. Chimney unit

FIGURE 42



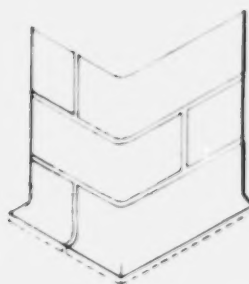
O. Glass block

FIGURE 43



P. Structural glazed tile

FIGURE 44



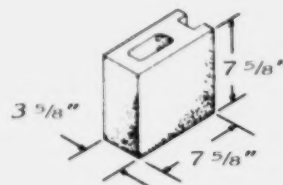
INFORMATION SHEET

XII. Sizes of most commonly used concrete masonry units

(NOTE: Sizes listed are *nominal* dimensions; sizes shown with the examples are *actual* dimensions.)

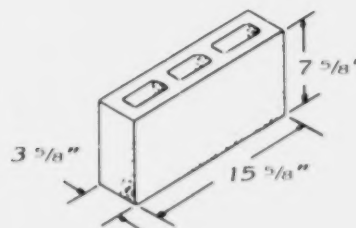
- A. 4" x 8" x 8"
(Figure 45)

FIGURE 45



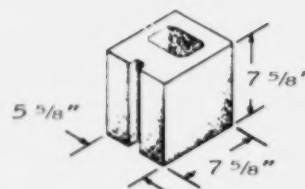
- B. 4" x 8" x 16"
(Figure 46)

FIGURE 46



- C. 6" x 8" x 8"
(Figure 47)

FIGURE 47



INFORMATION SHEET

- D. 6" x 8" x 16"
(Figure 48)

- E. 8" x 8" x 8"
(Figure 49)

- F. 8" x 8" x 16"
(Figure 50)

- G. 10" x 8" x 8"
(Figure 51)

EXAMPLES:

FIGURE 48

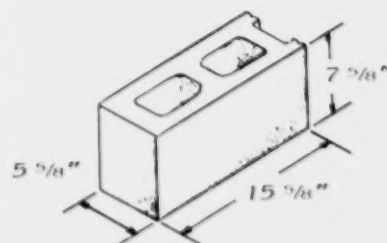


FIGURE 49

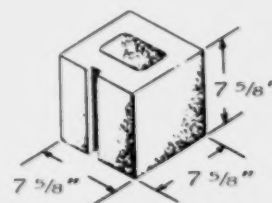


FIGURE 50

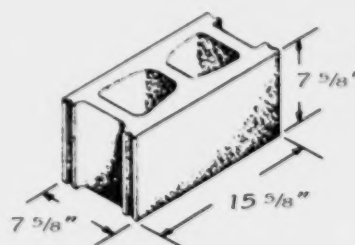
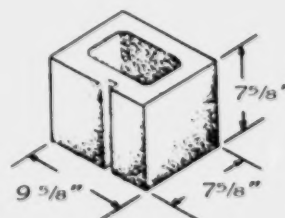


FIGURE 51



INFORMATION SHEET

- H. $10'' \times 8'' \times 16''$
(Figure 52)

- I. $12'' \times 8'' \times 8''$
(Figure 53)

- J. $12'' \times 8'' \times 16''$
(Figure 54)

- K. $2'' \times 4'' \times 8''$ solid
(Figure 55)

EXAMPLES:

FIGURE 52

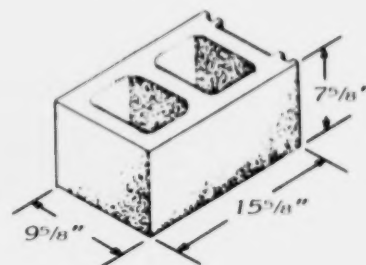


FIGURE 53

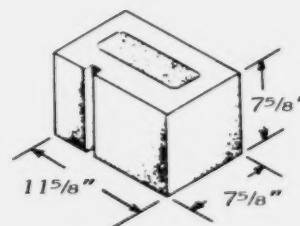


FIGURE 54

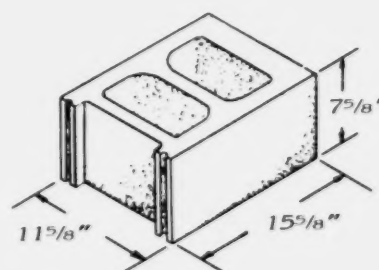
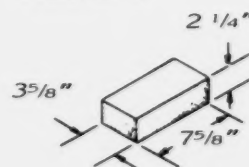


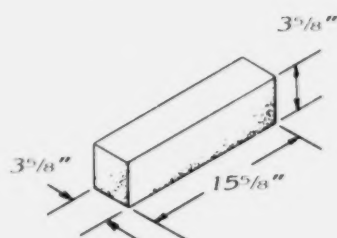
FIGURE 55



INFORMATION SHEET

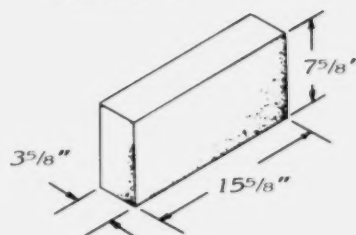
- L. 4" x 4" x 16" solid
(Figure 56)

FIGURE 56



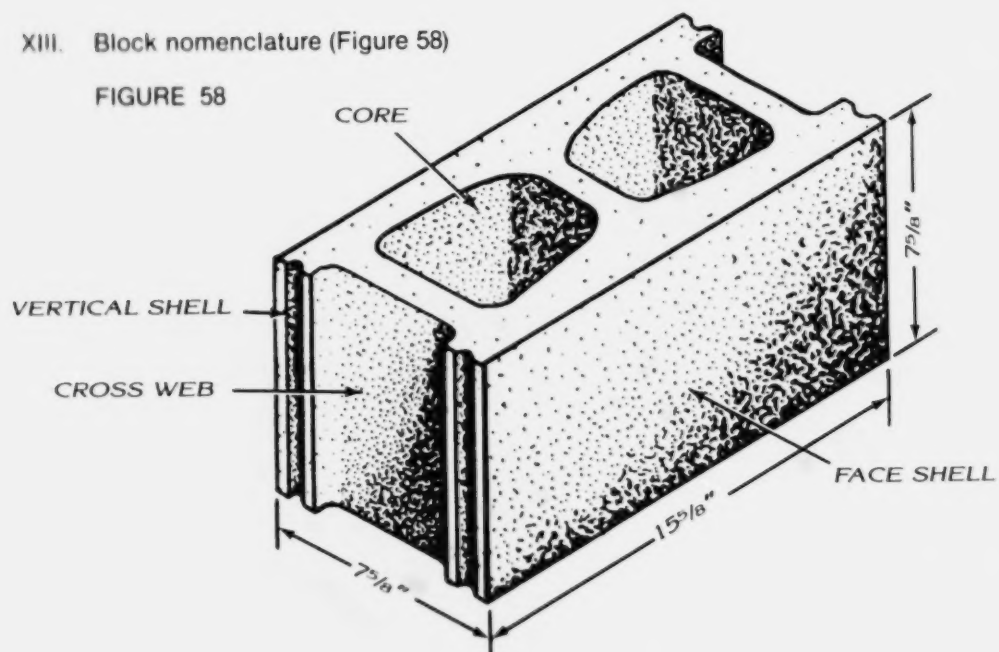
- M. 4" x 8" x 16" solid
(Figure 57)

FIGURE 57



- XIII. Block nomenclature (Figure 58)

FIGURE 58

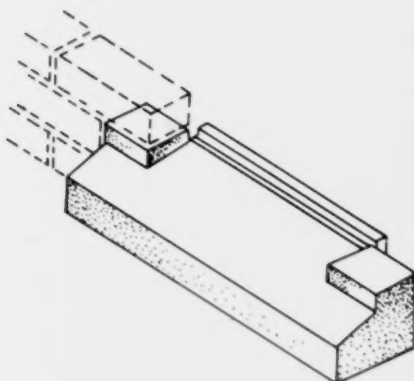


INFORMATION SHEET

XIV. Types of sills (Figures 59-63)

A. Lug

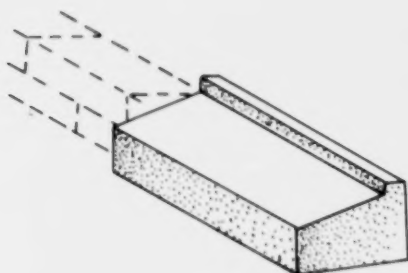
FIGURE 59



Used with permission of the International Masonry Institute Apprenticeship and Training Program, Washington, D.C.

B. Slip

FIGURE 60



Used with permission of the International Masonry Institute Apprenticeship and Training Program, Washington, D.C.

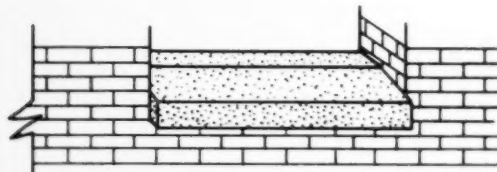


INFORMATION SHEET

C. Cast-in-place (concrete)

(NOTE: A cast-in-place sill may be in any of several designs.)

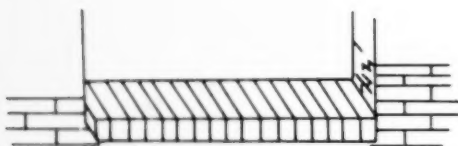
FIGURE 61



D. Special masonry

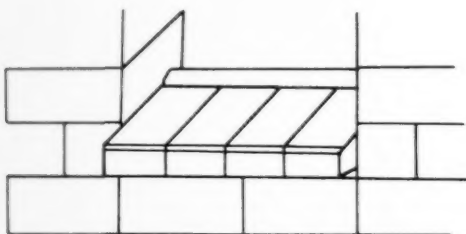
1. Brick rowlock

FIGURE 62



2. Concrete block

FIGURE 63



INFORMATION SHEET

XV. Types of lintels

A. Precast (Figures 64 and 65)

(NOTE: Precast lintels are available in various thicknesses to suit individual block walls, or they may be placed in pairs.)

FIGURE 64

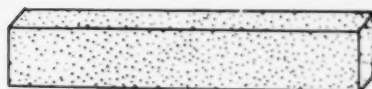
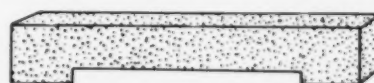


FIGURE 65



SPECIAL DESIGN

B. Angle iron (Figures 66-68)

FIGURE 66

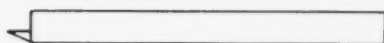


FIGURE 67

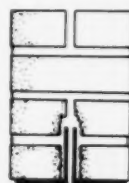
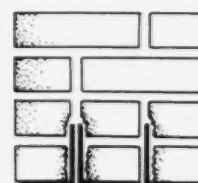
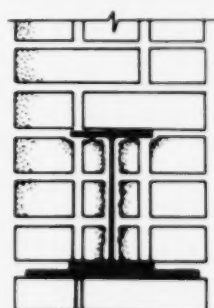
TWO ANGLE-IRON
LINTELS
(SIDE VIEW)

FIGURE 68

THREE ANGLE-IRON
LINTELS
(SIDE VIEW)

C. Steel I-beam and plate (Figure 69)

FIGURE 69



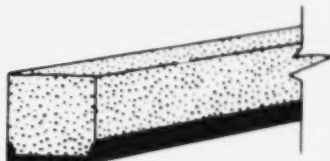
(SIDE VIEW)



INFORMATION SHEET

D. Poured-in-place reinforced concrete over channel iron (Figure 70)

FIGURE 70



E. Bond beam (Figures 71-74)

FIGURE 71

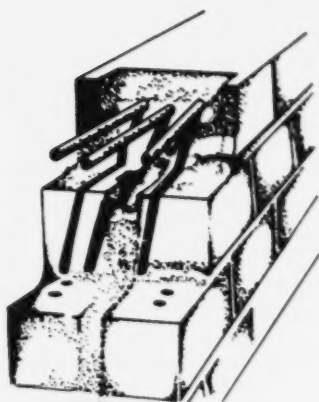
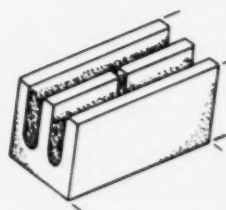
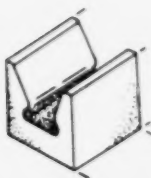


FIGURE 72



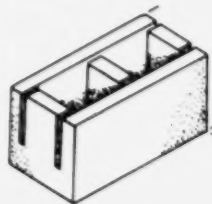
CLOSED-BOTTOM
BOND-BEAM BLOCK

FIGURE 73



BOND-BEAM BLOCK

FIGURE 74



OPEN-BOTTOM
BOND-BEAM BLOCK

XVI. Terms and definitions associated with mortars

- A. **Admixture** — Component added in small quantities to mortar mix to achieve a specific result
- B. **Air-entraining agent** — Admixture that incorporates microscopic air bubbles into the mix to increase resilience and durability

INFORMATION SHEET

- C. **Autogenous healing** — Ability of hairline cracks in mortar to reknit or reseal themselves
- D. **Consistency** — Degree of wetness and workability of mortar
- E. **Cubic-foot measuring box** — Box used to measure dry ingredients used in mortar
- F. **Cut** — Mix and blend mortar thoroughly to a desired consistency using chopping/pushing/pulling motion of hoe
- G. **Durability** — Ability to withstand wear, abrasion, and weathering
- H. **Efflorescence** — Deposit, usually white in color, of water-soluble salts on masonry surface
- I. **Ingredients** — Components of a mixture
- J. **Masonry cement** — Mill-mixed combination of portland cement, lime, and additives
- K. **Portland cement** — Manufactured product consisting of finely ground and mixed lime, silicon, alumina, iron, and gypsum
- L. **psi** — Pounds per square inch
- M. **Workability** — Ease with which mortar can be placed and handled

XVII. Ingredients used in mortars

- A. Portland cement/lime mortars
 - 1. Portland cement
 - 2. Hydrated lime or lime putty
 - 3. Sand
 - 4. Water
- B. Masonry cement mortars
 - 1. Masonry cement Type II
 - 2. Sand
 - 3. Water

XVIII. Recommended uses of types of mortar

(NOTE: Portland cement/lime mortars and masonry cement mortars are each divided into four types of mortars that are determined by the proportions of their ingredients. The Brick Institute of America [BIA] developed the specifications for the four types of mortar used in brick construction. See Table 1.)



INFORMATION SHEET

- A. **Type M** (mortar with a high compressive strength of at least 2,500 psi after curing 28 days and with somewhat greater durability than some other types) — Used for masonry below grade and in contact with the earth, such as foundations, retaining walls, and manholes; this type will withstand severe frost action and high lateral loads
- B. **Type S** (mortar with a fairly high compressive strength of at least 1,800 psi after curing 28 days) — Used in reinforced masonry and for standard masonry where maximum flexural strength is required; also used when mortar is the sole bonding agent between facing and backing units
- C. **Type N** (mortar with a medium compressive strength of at least 750 psi after being cured 28 days) — Used for exposed masonry above grade and where high compressive strength or lateral masonry strengths are required
- D. **Type O** (mortar with a low compressive strength of at least 350 psi after curing 28 days) — Used for general interior walls; may be used for load-bearing walls of solid masonry if axial compressive stress does not exceed 100 psi and wall will not be exposed to weathering or freezing

EXAMPLE:

TABLE 1: Mortar Proportions by Volume

Type	Portland Cement/Lime Mortars		
	Portland Cement	Hydrated Lime or Lime Putty	Sand
M	1	1/4	3
S	1	1/2	4 1/2
N	1	1	6
O	1	2	9

XIX. Purposes of mortar

- A. Binds masonry units
- B. Seals against air and moisture
- C. Acts as a bond for reinforcement, anchor bolts, and metal ties
- D. Enhances appearance

XX. Types of admixtures used in mortar and their results

- A. **Air-entraining agent** — Increases resistance to freezing and thawing and increases life and durability of mortar

CAUTION

A mortar mix that has more than 12 percent air-entraining agent will not have a strong bond strength.

INFORMATION SHEET

- B. **Waterproofing agent** — Prevents moisture from penetrating masonry walls
- C. **Pigment** — Produces a desired color to enhance appearance of masonry units and to help create unusual effects
- D. **Accelerator** — Accelerates setting time, thus helping to prevent freezing; increases early strength



BRICKLAYING MATERIALS
UNIT I

TEST

NAME _____

SCORE _____

1. Match terms associated with masonry units to their definitions. Write the correct numbers in the blanks.

_____a. Arrangement of particles of raw materials in brick; appearance and finish of a brick

1. Pattern bond
2. Texture
3. Composition

_____b. Arrangement of masonry units to form a pattern, design, or texture

1. Pattern bond
2. Texture
3. Structural bond

_____c. Length of time required for mortar to harden enough to sustain the weight of masonry set on top of it

1. Setting time
2. Structural bond
3. Compressive strength

_____d. Refers to variations in size of standard brick and oversize brick

1. Modular
2. Nonmodular
3. Dimension

_____e. Adhesion of mortar to masonry unit, wall ties, or other reinforcement

1. Structural bond
2. Pattern bond
3. Mortar bond

_____f. Ability to withstand wear, abrasion, and weathering

1. Structural bond
2. Compressive strength
3. Durability

_____g. Brick's resistance to increasing loads or stress placed on it before it breaks

1. Compressive strength
2. Structural bond
3. Durability



TEST

_____h. Weight or amount of water a masonry unit absorbs at certain conditions for a stated length of time

1. Absorption rate
2. Flow rate
3. Setting time

_____i. Measurements or sizes

1. Nonmodular
2. Dimensions
3. Modular

_____j. Ability of mortar to stick to masonry unit

1. Adhesion
2. Mortar board
3. Structural bond

_____k. Refers to standardized units or dimensions for flexibility and variety in use

1. Dimension
2. Nonmodular
3. Modular

_____l. Standardized names of portions or segments of a masonry unit

1. Identification
2. Nomenclature
3. Designation

_____m. Arrangement in which individual units are interlocked or tied together to distribute weight of wall

1. Structural bond
2. Positions
3. Durability

2. Name types of brick.

a. _____

b. _____

TEST

3. Match brick sizes to their correct names. Write the correct numbers in the blanks.

_____a. Triple	1. $3'' \times 2 \frac{3}{4}'' \times 9 \frac{3}{4}''$
_____b. SCR	2. $8'' \times 4'' \times 12''$
_____c. Norman	3. $4'' \times 4'' \times 8''$
_____d. 3-inch	4. $4'' \times 3 \frac{1}{5}'' \times 12''$
_____e. Oversize	5. $6'' \times 3 \frac{1}{5}'' \times 12''$
_____f. 6-inch jumbo	6. $4'' \times 5 \frac{1}{3}'' \times 12''$
_____g. Modular	7. $4'' \times 3 \frac{1}{5}'' \times 8''$
_____h. Norwegian	8. $3 \frac{3}{4}'' \times 2 \frac{1}{4}'' \times 8''$
_____i. Economy 12 or jumbo utility	9. $3 \frac{3}{4}'' \times 2 \frac{3}{4}'' \times 8''$
_____j. Roman	10. $4'' \times 2'' \times 12''$
_____k. 8-inch jumbo	11. $4'' \times 2 \frac{2}{3}'' \times 8''$
_____l. Double	12. $4'' \times 2 \frac{2}{3}'' \times 12''$
_____m. Nonmodular	13. $6'' \times 2 \frac{2}{3}'' \times 12''$
_____n. Economy 8 or jumbo closure	14. $4'' \times 5 \frac{1}{3}'' \times 8''$
_____o. Engineer	15. $6'' \times 4'' \times 12''$
_____p. 6-inch Norwegian	16. $4'' \times 4'' \times 12''$

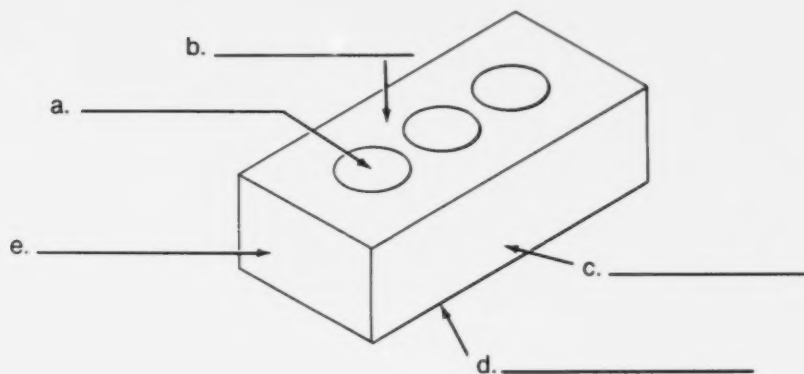
4. State three factors to consider when selecting brick.

- a. _____
- b. _____
- c. _____



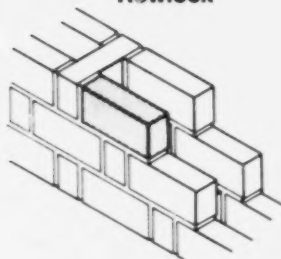
TEST

5. Label the brick illustrated below, using the correct nomenclature. Write the correct names in the blanks.



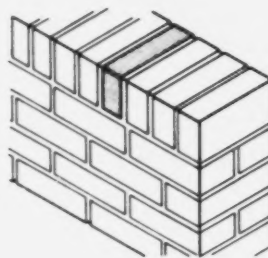
6. Identify brick positions as they appear in the walls illustrated. Write the correct names in the blanks.

**Stretcher
Soldier
Rowlock**

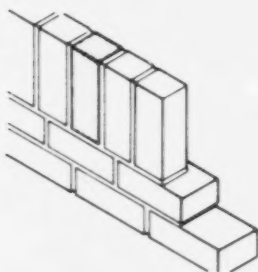


a. _____

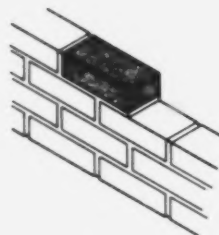
**Shiner
Sailor
Header**



b. _____

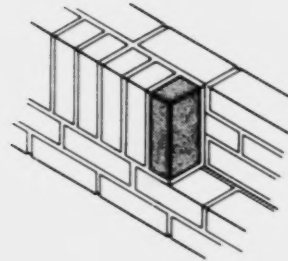
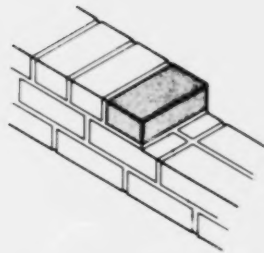


c. _____



d. _____

TEST



e. _____ f. _____

7. Describe absorption characteristics of hard and soft brick.

a. Hard brick

1. _____
2. _____
3. _____

b. Soft brick

1. _____
2. _____
3. _____

8. State four important properties of brick.

- a. _____
- b. _____
- c. _____
- d. _____

47

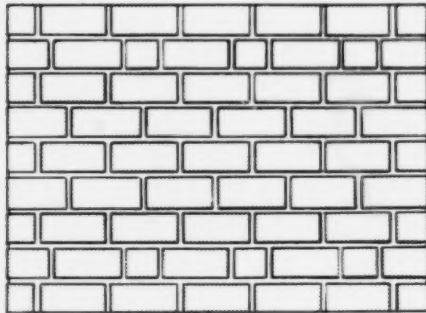


TEST

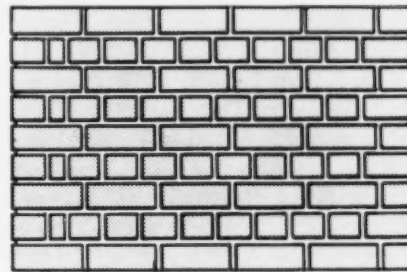
9. Distinguish among types of bonds. Write an "M" in the blank before mortar bond, an "S" in the blank before structural bond, and a "P" in the blank before pattern bond.

- ____ a. Arrangement of masonry units to form a pattern or design
 ____ b. Adhesion of masonry units with joint mortar
 ____ c. Interlocking of masonry units with each other

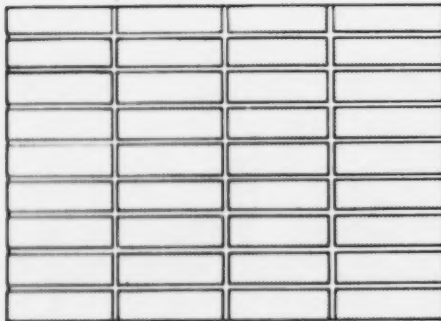
10. Label the basic structural bonds illustrated. Write the correct names in the blanks.



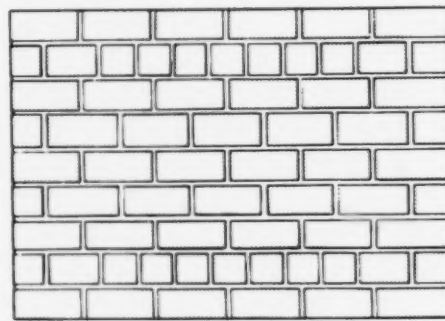
a. _____



b. _____

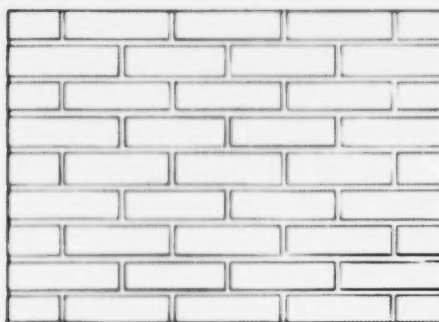


c. _____



d. _____

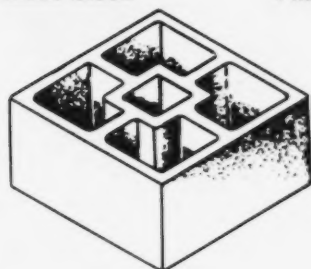
TEST



e. _____

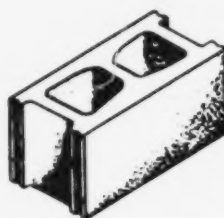
11. Identify the common concrete masonry units illustrated. Write the correct names in the blanks.

Sound absorbing
Chimney unit
Combination jamb
Glass block



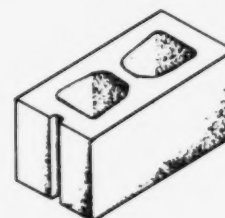
a. _____

Corner
Jamb
Conduit
Pilaster



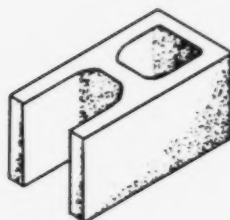
b. _____

Stretcher
Header
Ornamental
Bullnose

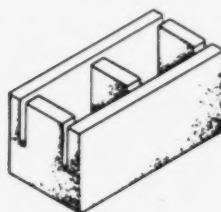


c. _____

Return corner
Structural glazed tile
Bond beam
Control joint



d. _____

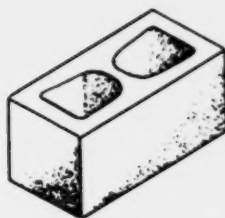
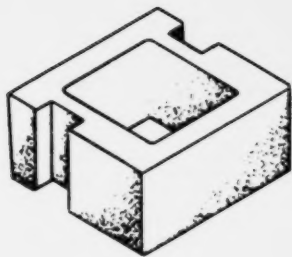


e. _____

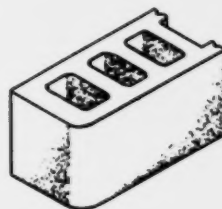
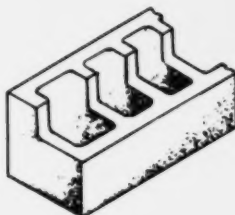
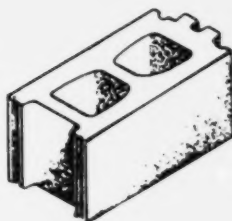


f. _____

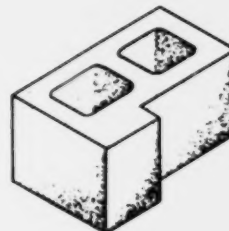
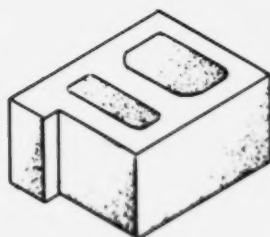
TEST



g. _____ h. _____ i. _____

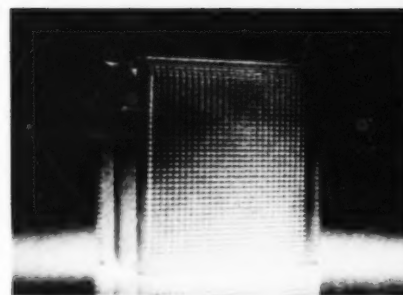
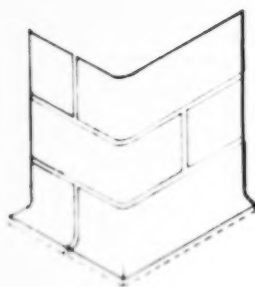


j. _____ k. _____ l. _____



m. _____ n. _____

TEST



o. _____

p. _____

12. Select from the following list sizes of the most commonly used concrete masonry units. Write an "X" in the blank before each correct answer.

____ a. 6" x 8" x 16"

____ h. 4" x 8" x 16"

____ b. 10" x 8" x 16"

____ i. 12" x 8" x 16"

____ c. 2" x 2" x 16"

____ j. 8" x 8" x 16" solid

____ d. 4" x 4" x 16" solid

____ k. 10" x 8" x 8"

____ e. 12" x 8" x 8"

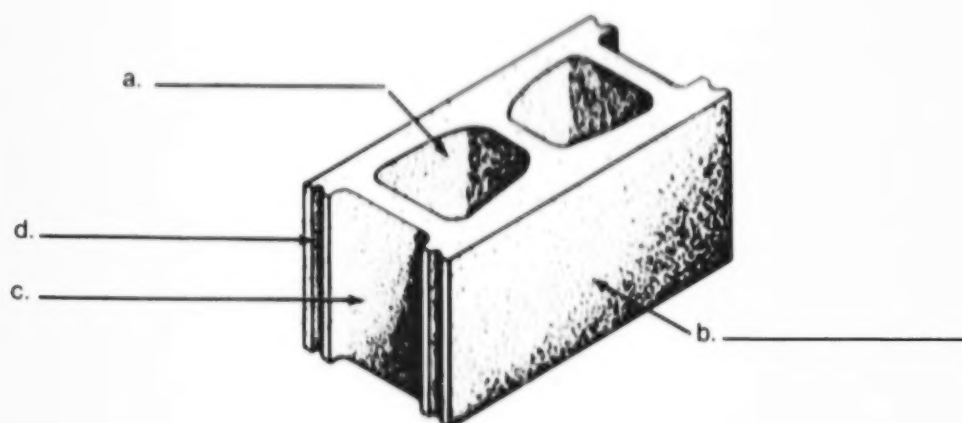
____ l. 8" x 8" x 8"

____ f. 8" x 8" x 16"

____ m. 4" x 8" x 8"

____ g. 4" x 4" x 4"

13. Label the block below, using the correct nomenclature. Write the correct names in the blanks.



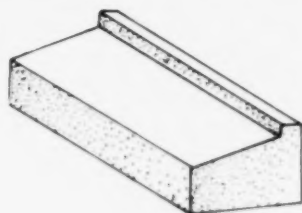
TEST

14. Identify the types of sills illustrated. Write the correct names in the blanks.

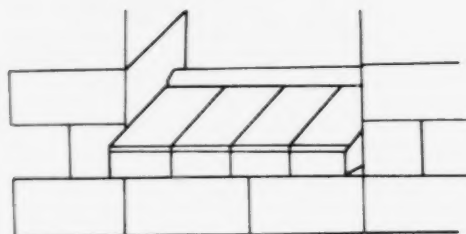
**Cast-in-place
Concrete block**

**Slip
Lug**

Brick rowlock



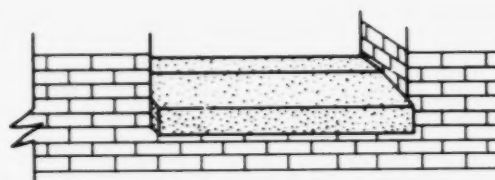
a. _____



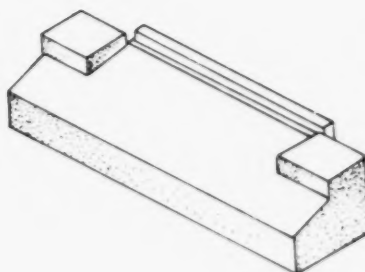
b. _____



c. _____



d. _____



e. _____

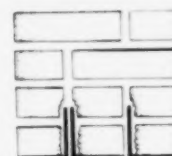
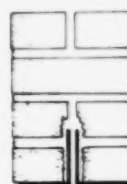
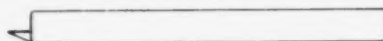
TEST

15. Identify the types of lintels illustrated. Write the correct names in the blanks.

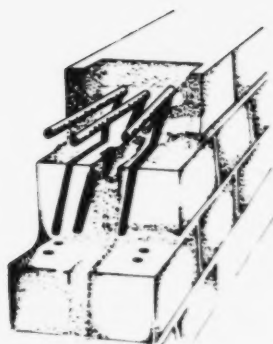
Steel I-beam and plate
 Poured-in-place reinforced
 concrete over channel iron
 Precast

Angle iron
 Bond beam

Open-bottom bond-beam block
 Closed-bottom bond-beam block
 Bond-beam block



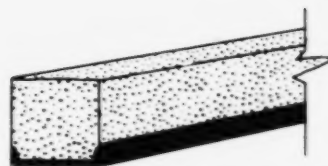
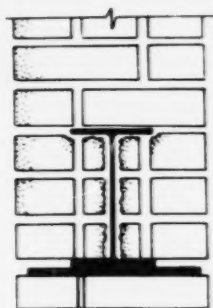
a. _____



b. _____

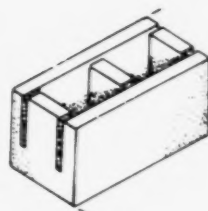
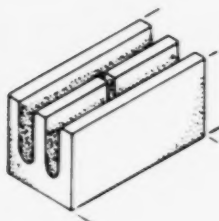
c. _____

TEST



d. _____

e. _____



f. _____

g. _____

h. _____

16. Match terms associated with mortars to their definitions. Write the correct numbers in the blanks.

_____ a. Admixture that incorporates microscopic air bubbles into the mix to increase resilience and durability

1. Admixture
2. Air-entraining agent
3. Efflorescence

_____ b. Mill-mixed combination of portland cement, lime, and additives

1. Portland cement
2. Admixture
3. Masonry cement

_____ c. Degree of wetness and workability of mortar

1. Slump
2. psi
3. Consistency

TEST

- ____d. Components of a mixture
 - 1. Ingredients
 - 2. Elements
 - 3. Sand and gravel
- ____e. Mix and blend mortar thoroughly to a desired consistency using chopping/pushing/pulling motion
 - 1. Slice
 - 2. Cut
 - 3. Mix
- ____f. Pounds per square inch
 - 1. psi
 - 2. ppsi
 - 3. ps"
- ____g. Component added in small quantities to mortar mix to achieve a specific result
 - 1. Waterproofing
 - 2. Air entraining agent
 - 3. Admixture
- ____h. Ability of hairline cracks in mortar to reknit or reseal themselves
 - 1. Unite
 - 2. Autogenous healing
 - 3. Repair
- ____i. Box used to measure dry ingredients used in mortar
 - 1. Cubic-foot measuring box
 - 2. Mortar box
 - 3. Square box
- ____j. Ease with which mortar can be placed and handled
 - 1. High slump
 - 2. Consistency
 - 3. Workability
- ____k. Deposit, usually white in color, of water-soluble salts on masonry surface
 - 1. Dye
 - 2. Efflorescence
 - 3. Admixture
- ____l. Manufactured product consisting of finely ground and mixed lime, silicon, alumina, iron, and gypsum
 - 1. Masonry cement
 - 2. Portland cement
 - 3. Mortar



TEST

_____m. Ability to withstand wear, abrasion, and weathering

1. High strength
2. Waterproofed
3. Durability

17. List ingredients used in mortars.

a. Portland cement/lime mortars

1. _____
2. _____
3. _____
4. _____

b. Masonry cement mortars

1. _____
2. _____
3. _____

18. Match types of mortar to their recommended uses. Write the correct numbers in the blanks.

_____a. Used for exposed masonry above grade and where high compressive strength or lateral masonry strengths are required

_____b. Used for general interior walls; may be used for load-bearing walls of solid masonry if axial compressive stress does not exceed 100 psi and wall will not be exposed to weathering or freezing

_____c. Used for masonry below grade and in contact with the earth, such as foundations, retaining walls, and manholes; this type will withstand severe frost action and high lateral loads

_____d. Used in reinforced masonry and for standard masonry where maximum flexural strength is required; also used when mortar is the sole bonding agent between facing and backing units

1. Type S (mortar with a fairly high compressive strength of at least 1,800 psi after curing 28 days)

2. Type O (mortar with a low compressive strength of at least 350 psi after curing 28 days)

3. Type N (mortar with a medium compressive strength of at least 750 psi after being cured 28 days)

4. Type M (mortar with a high compressive strength of at least 2,500 psi after curing 28 days and with somewhat greater durability than some other types)

TEST

19. State two purposes of mortar.

a. _____

b. _____

20. Match types of admixtures used in mortar to their results. Write the correct numbers in the blanks.

_____ a. Prevents moisture from penetrating masonry walls

1. Accelerator

_____ b. Accelerates setting time, thus helping to prevent freezing; increases early strength

2. Pigment

_____ c. Increases resistance to freezing and thawing and increases life and durability of mortar

3. Air-entraining agent

_____ d. Produces a desired color to enhance appearance of masonry units and to help create unusual effects

4. Waterproofing agent



BRICKLAYING MATERIALS UNIT I

ANSWERS TO TEST

- | | | | |
|---------|------|------|------|
| 1. a. 2 | e. 3 | i. 2 | m. 1 |
| b. 1 | f. 3 | j. 1 | |
| c. 1 | g. 1 | k. 3 | |
| d. 2 | h. 1 | l. 2 | |

2. a. Building brick
b. Face brick

- | | | | |
|---------|-------|-------|------|
| 3. a. 6 | e. 9 | i. 16 | m. 8 |
| b. 13 | f. 15 | j. 10 | n. 3 |
| c. 12 | g. 11 | k. 2 | o. 7 |
| d. 1 | h. 4 | l. 14 | p. 5 |

4. Answer should include any three of the following.

- | | |
|-------------------------|--------------------|
| a. Composition | e. Color |
| b. Manufacturing method | f. Special effects |
| c. Strength | g. Economy |
| d. Appearance | |

- | | |
|------------|-----------|
| 5. a. Core | d. Bottom |
| b. Top | e. End |
| c. Side | |

- | | |
|--------------|--------------|
| 6. a. Shiner | d. Stretcher |
| b. Rowlock | e. Header |
| c. Sailor | f. Soldier |

7. Description should include the following.

- | |
|------------------------------------|
| a. Hard brick |
| 1. Very dense |
| 2. Low suction or absorption rate |
| 3. Slow setting |
| b. Soft brick |
| 1. Porous |
| 2. High suction or absorption rate |
| 3. Fast setting |



ANSWERS TO TEST

8. Answer should include any four of the following.

- | | |
|-------------------|-------------------------|
| a. Color | d. Absorption rate |
| b. Texture | e. Compressive strength |
| c. Size variation | f. Durability |

9. a. P
b. M
c. S

- | | |
|----------------|------------------------|
| 10. a. Flemish | d. Common (American) |
| b. English | e. Running (stretcher) |
| c. Stack | |

- | | |
|-------------------|---------------------------|
| 11. a. Ornamental | i. Sound absorbing |
| b. Stretcher | j. Control joint |
| c. Jamb | k. Header |
| d. Conduit | l. Bullnose |
| e. Bond beam | m. Combination jamb |
| f. Chimney unit | n. Return corner |
| g. Pilaster | o. Structural glazed tile |
| h. Corner | p. Glass block |

12. a, b, d, e, f, h, i, k, l, m

- | | |
|---------------|-------------------|
| 13. a. Core | c. Cross web |
| b. Face shell | d. Vertical shell |

- | | |
|-------------------|------------------|
| 14. a. Slip | d. Cast in place |
| b. Concrete block | e. Lug |
| c. Brick rowlock | |

- | | |
|---------------------------|--|
| 15. a. Angle iron | e. Poured-in-place reinforced concrete over channel iron |
| b. Bond beam | f. Closed-bottom bond-beam block |
| c. Precast | g. Bond-beam block |
| d. Steel I-beam and plate | h. Open-bottom bond-beam block |

- | | | | |
|----------|------|------|------|
| 16. a. 2 | e. 2 | i. 1 | m. 3 |
| b. 3 | f. 1 | j. 3 | |
| c. 3 | g. 3 | k. 2 | |
| d. 1 | h. 2 | l. 2 | |

ANSWERS TO TEST

17. a. 1. Portland cement
2. Hydrated lime or lime putty
3. Sand
4. Water
- b. 1. Masonry cement Type II
2. Sand
3. Water
18. a. 3 c. 4
b. 2 d. 1
19. Answer should include any two of the following.
- a. Binds masonry units
b. Seals against air and moisture
c. Acts as a bond for reinforcement, anchor bolts and metal ties
d. Enhances appearance
20. a. 4 c. 3
b. 1 d. 2



BRICKLAYING TOOLS UNIT II

UNIT OBJECTIVE

After completing this unit, the student should be able to match tools to their specifications. The student will show this ability by completing the unit test with a minimum score of 80 per cent.

SPECIFIC OBJECTIVES

After completing this unit, the student should be able to

1. Match terms associated with bricklaying tools to their definitions.
2. Distinguish between modular spacing rule and standard brick spacing rule.
3. Identify basic hand tools included in a bricklayer's beginner's tool kit.
4. Match types of hammers to their specific uses.
5. Match types of chisels to their specific uses.
6. Match types of squares to their specific uses.
7. Match types of jointers to their specific uses.
8. Match types of trowels to their specific uses.
9. Name factors to consider when selecting a brick trowel.
10. Identify and describe the correct way to hold a brick trowel.
11. Identify tools used in determining course alignment.
12. Identify tools and equipment related to bricklaying.
13. State basic rules concerning care of the level.
14. State basic rules concerning care of hand tools.
15. State safety rules pertaining to hand tools.
16. Match terms associated with power tools to their definitions.
17. Match power tools to their specific uses.
18. Label parts of a masonry saw.



OBJECTIVE SHEET

19. Name types of cutting blades used on masonry saws.
20. List factors to consider when caring for a masonry saw.
21. State safety rules pertaining to the use of a masonry saw.

BRICKLAYING TOOLS
UNIT II

SUGGESTED ACTIVITIES

- I. Unit contents
 - A. Objective sheet
 - B. Suggested activities
 - C. Assignment Sheet #1 — Hold a Brick Trowel Correctly
 - D. Information sheet
 - E. Test
 - F. Answers to test
- II. Instructor's guide
 - A. Review unit and plan presentation.
 - B. Obtain a complete set of tools and equipment to show students.
 - C. Introduce unit to students.
 - Discuss the various types of tools used by bricklayers.
 - Discuss the uses of the various tools and equipment.
 - D. Provide students with objective sheet.
 - E. Discuss unit and specific objectives.
 - F. Provide students with information and assignment sheets.
 1. Use Information Sheet, Section I, to discuss terms and definitions associated with bricklaying tools.
 - Point out the importance of knowing the definitions of these terms and how knowing them will help to better understand this unit.
 - Display examples of tools, equipment, and materials when possible.
 2. Use Information Sheet, Section II, to discuss the difference between a modular spacing rule and standard spacing rule.
 3. Use Information Sheet, Section III, to discuss hand tools included in a bricklayer's beginner's tool kit.



SUGGESTED ACTIVITIES

- Display examples of the various tools.
 - Have students identify the tools.
4. Use Information Sheet, Sections IV through XV to discuss the various types of hand tools, their uses, and basic rules concerning care and safety.
 - Plan a field trip to the site of a construction job to see how the various tools are being used.
 - Make a set of flash cards containing pictures of related hand tools. Show students flash cards and have them identify the pictures and write their answers on a sheet of paper.
 - Discuss rules concerning care of hand tools.
 - Discuss safety rules pertaining to hand tools.
 - Have students review sections on hand tool safety in the safety unit of *Fundamentals of Construction*.
 5. Use Information Sheet, Section XVI to discuss terms and definitions associated with power tools.
 - Display examples of as many terms as is possible.
 6. Use Information Sheet, Section XVII, to discuss power tools and their uses.
 - Have students identify power tools in the shop or work area and explain how they may be used.
 - Plan a field trip to a job site to see how many of the tools are being used and how they are being used. Have students make a list of all the tools they see being used.
 - Make a set of flash cards containing pictures of related power tools. Show students flash cards and then have them identify the pictures and write their answers on a sheet of paper.
 7. Use Information Sheet, Sections XVIII through XXI to discuss masonry saws, saw blades, care of the saw and safety rules pertaining to the use of masonry saws.
 - Display a masonry saw and various types of saw blades used on the saw.

SUGGESTED ACTIVITIES

- Have students identify different parts of the masonry saw and explain the purpose of each part.
 - Have each student identify a saw blade and explain when it is used and what type of material it is used on.
 - Have each student state one factor to consider when caring for the masonry saw.
 - Explain how expensive some of the saw blades are and why proper care and safety are necessary to protect the saw and saw blades.
 - Make a set of flash cards containing pictures of safety equipment and clothing used by bricklayers. Show students flash cards and have them identify the pictures and write down the answers on a sheet of paper.
 - Have each student state one of the safety rules pertaining to using masonry saws.
8. Use Assignment Sheet #1 to discuss the correct way to hold a brick trowel.
- Demonstrate the procedures for holding a brick trowel correctly.
 - Have each student demonstrate the correct procedures; if they cannot do it correctly have them re-read the procedures and then try again.
 - Work with the students until all of them can hold a brick trowel correctly.

G. Give test.

H. Critique test and discuss in class.

I. Reteach and retest as necessary.

J. Complete appropriate sections of competency profiles.

(NOTE: A master of the competency profile for this book is provided at the front of the instructor edition. You may duplicate the profile and distribute it to students as needed.)

- III. Unit reference — Hendrix, Laborn J. "Bud." *Bricklaying Curriculum—Principles of Bricklaying*. Stillwater, Oklahoma: State Department of Vocational and Technical Education/Curriculum and Instructional Materials Center, and The Associated General Contractors of America, 1984.



BRICKLAYING TOOLS
UNIT II

INFORMATION SHEET

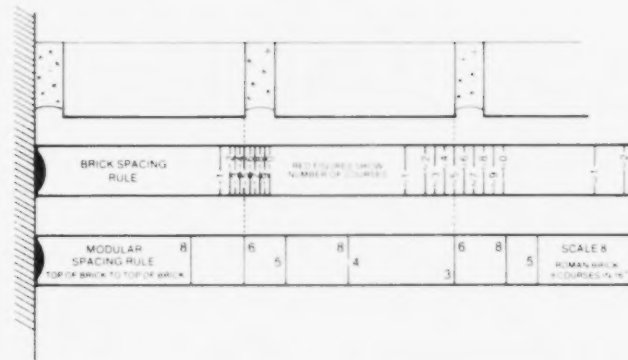
- I. Terms and definitions associated with bricklaying tools
 - A. **Brick tongs** — Tool designed for moving or carrying several bricks
 - B. **Chalk box and line** — Reel-type container holding chalk and line; line is pulled out and used to lay out and mark lines on floor for first course of brick or block
 - C. **Corner pole** — Adjustable rigid pole with line holder; used as a guide rather than building corners for a guide
 - D. **Ferrule** — Metal band around the handle of a trowel
 - E. **Line block** — Wood or plastic device used to keep mason's line tight
 - F. **Line pin** — Metal device used for securing mason's line at both ends of course height
 - G. **Mortarboard or pan** — Platform or pan used to hold mortar at a convenient location and height for use by bricklayer
 - H. **Parge** — To apply a thin coating of mortar or plaster to masonry
 - I. **Rake** — Metal device designed to rake out and shape mortar joints
 - J. **Skewback** — Sloping surface against which the end of an arch rests; may be brick cut on an angle
 - K. **Story pole** — Pole or rod upon which are indicated all of the masonry courses and openings, such as windows or doors, required in the job
 - L. **Temper** — To remix mortar to make it more workable
 - M. **Trowel** — Tool used to apply, spread, shape and smooth mortar when laying brick or block
- II. Difference between modular spacing rule and standard brick spacing rule (See Figure 1)
 - A. **Modular rule** — Used for spacing course height of modular materials
 - B. **Brick spacing rule** — Used for spacing nonmodular brick course height



INFORMATION SHEET

EXAMPLE:

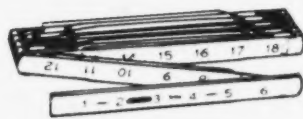
FIGURE 1



III. Basic hand tools included in a bricklayer's beginner's tool kit (Figures 2-13)

A. Brick spacing rule

FIGURE 2



B. Brick trowel

FIGURE 3



C. Brick hammer

FIGURE 4



D. 48-inch level

FIGURE 5



INFORMATION SHEET

E. Brick set

FIGURE 6



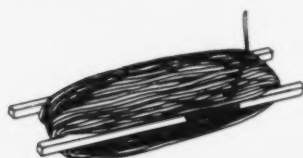
F. Concave jointer

FIGURE 7



G. Mason's line

FIGURE 8



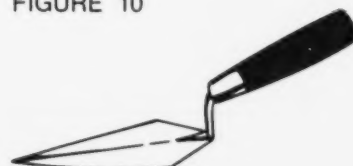
H. Line blocks

FIGURE 9



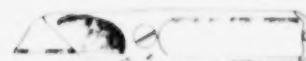
I. Pointing trowel

FIGURE 10



J. Utility knife

FIGURE 11



K. All-purpose brush

FIGURE 12



L. Tool bag

FIGURE 13



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INFORMATION SHEET

IV. Hammers and their uses

EXAMPLES:

A. Brick hammer (Figure 14)

1. Cutting bricks and blocks
2. Setting line pins
3. Cutting off fins and projections
4. Nailing wall ties

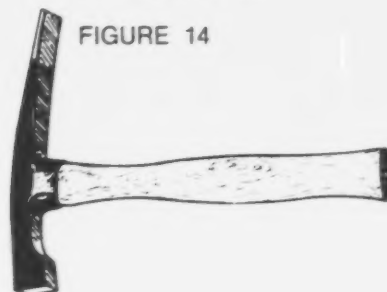


FIGURE 14

B. Tile hammer — Cutting tile (Figure 15)



FIGURE 15

C. Mash — Striking brickset and other chisels (Figure 16)



FIGURE 16

D. Bushhammer — Facing block or stone (Figure 17)



FIGURE 17

INFORMATION SHEET

EXAMPLE:

- E. Stonemason's hammer — Cutting and splitting stone (Figure 18)

FIGURE 18



V. Chisels and their uses

EXAMPLES:

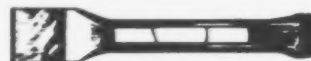
- A. Brick set — Cutting brick or block (Figure 19)

FIGURE 19



- B. Mason's chisel — Cutting brick, block and veined stone (Figure 20)

FIGURE 20



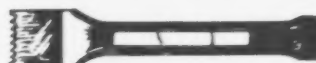
- C. Rubber-grip mason's chisel — Cushioning blow while cutting brick, block or stone (Figure 21)

FIGURE 21



- D. Tooth chisel — Cutting soft stone (Figure 22)

FIGURE 22



INFORMATION SHEET

EXAMPLES:

- E. Pitching tool — Sizing, trimming, and facing hard stone; cutting heavy stone (Figure 23)

FIGURE 23



- F. Plugging chisel — Chipping mortar from joints (Figure 24)

FIGURE 24

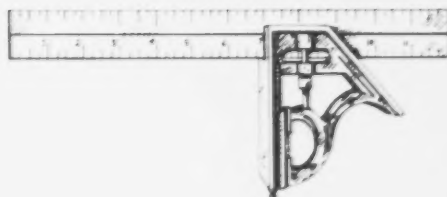


VI. Squares and their uses (Figures 25-27)

- A. Combination — Marking straight cuts of various angles

EXAMPLE:

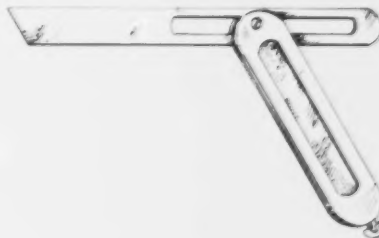
FIGURE 25



- B. Bevel — Marking skewbacks and cuts of various angles

EXAMPLE:

FIGURE 26



INFORMATION SHEET

- C. Steel framing square — Laying out walls, corners, and checking square of corner units

FIGURE 27



VII. Joints and their uses (Figures 28-35)

A. Concave jointer and sled-runner concave jointer

1. Compressing joints
2. Weatherproofing joints
3. Giving concave appearance to joints

EXAMPLE:

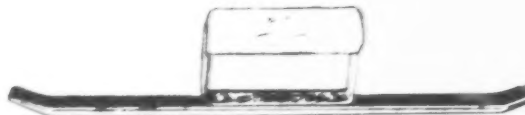
FIGURE 28



CONCAVE JOINTER

EXAMPLE:

FIGURE 29



SLED-RUNNER CONCAVE JOINTER

INFORMATION SHEET

B. Flat jointer — Compressing and shaping joints

EXAMPLE:

FIGURE 30



C. V-jointer and sled-runner V-jointer

1. Compressing joints
2. Weatherproofing joints
3. Giving a V-design to joints

EXAMPLE:

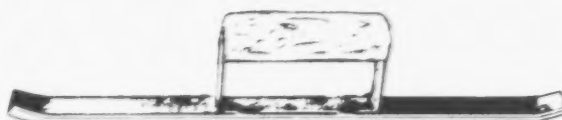
FIGURE 31



V-JOINTER

EXAMPLE:

FIGURE 32



SLED-RUNNER V-JOINTER

D. Caulking trowel (tuck-pointer)

1. Compressing joints
2. Pointing joints
3. Shaping joints

EXAMPLE:

FIGURE 33



INFORMATION SHEET

E. Rake and skate-wheel rake

1. Raking out joints and leaving the desired finish
2. Creating attractive joint designs

EXAMPLE:

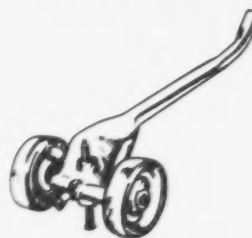
FIGURE 34



RAKE

EXAMPLE:

FIGURE 35



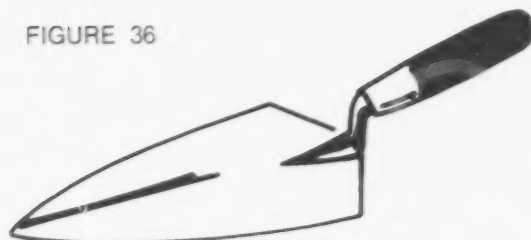
SKATE-WHEEL RAKE

VIII. Types of trowels and their uses (Figures 36-40)

A. Brick — Spreading mortar for laying brick, block, and stone

EXAMPLE:

FIGURE 36



B. Pointing — Pointing, grouting, and mixing mortar

EXAMPLE:

FIGURE 37

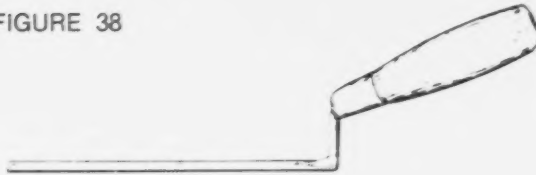


INFORMATION SHEET

C. Caulking (tuck-pointer) — Pointing, caulking, and tooling joints

EXAMPLE:

FIGURE 38



D. Margin — Mixing mortar, grout, and waterproofing materials in small amounts

EXAMPLE:

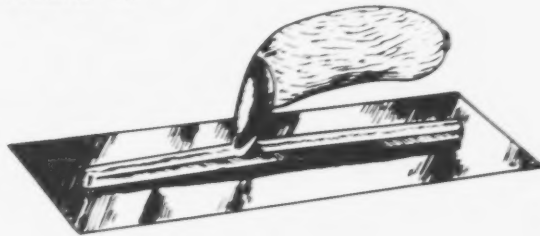
FIGURE 39



E. Plastering — Plastering and parging mortar or waterproofing onto walls; applying base coat for tile and veneer

EXAMPLE:

FIGURE 40



IX. Factors to consider when selecting a brick trowel

- A. Balance
- B. Shape of blade
- C. Weight
- D. Size

INFORMATION SHEET

- E. Flexibility of blade
- F. Quality of steel
- G. Angle of blade in relation to handle
- H. Type of handle

(NOTE: Trowels are made in a variety of sizes and shapes, with wood, plastic, or leather handles.)

- X. Correct way to hold a brick trowel (Figure 41)

(NOTE: The method of holding a trowel may vary slightly due to the size of a person's hand and the feel of the trowel in the hand.)

FIGURE 41



- A. Grasp handle of trowel with fingers on underside of handle
- B. Place thumb on top of ferrule, pointing toward tip of blade
- C. Hold handle with a firm yet flexible grip
- D. Apply pressure between thumb and forefinger

- XI. Tools used in determining course alignment (Figures 42-52)

A. Mason's line

B. 48-inch level

FIGURE 42



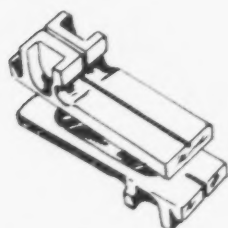
FIGURE 43



INFORMATION SHEET

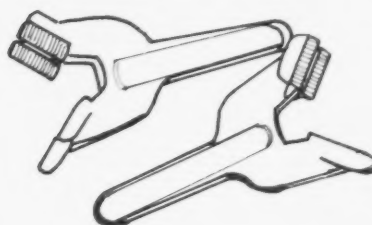
C. Line blocks

FIGURE 44



D. Corner blocks

FIGURE 45



E. Corner pole

FIGURE 46



F. Story pole

FIGURE 47



G. Steel tapes

FIGURE 48



H. Line pins

FIGURE 49



INFORMATION SHEET

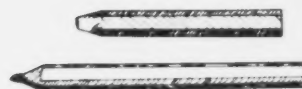
I. Line twig

FIGURE 50



J. Marking crayon and pencil

FIGURE 51



K. Chalk box and line

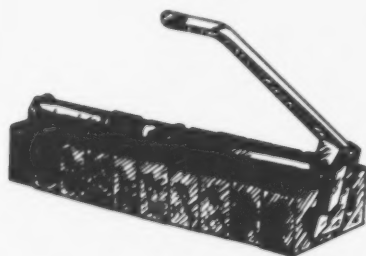
FIGURE 52



XII. Tools and equipment related to bricklaying (Figures 53-63)

A. Brick tongs

FIGURE 53



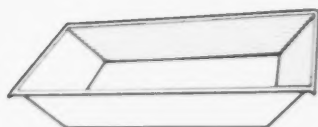
B. Bolt cutter

FIGURE 54



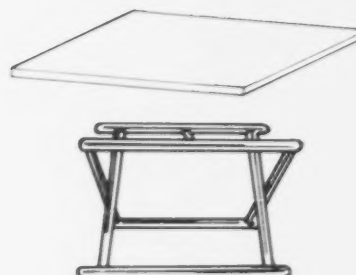
C. Mortar box

FIGURE 55



D. Mortarboard and stand

FIGURE 56



INFORMATION SHEET

E. Mortar pan and stand

FIGURE 57



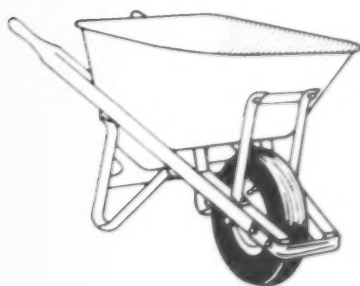
G. All-purpose brush

FIGURE 59



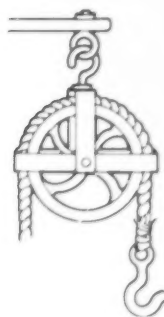
I. Wheelbarrow

FIGURE 61



F. Rope and pulley

FIGURE 58



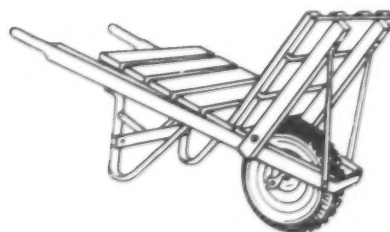
H. Water bucket

FIGURE 60



J. Brick and tile barrow

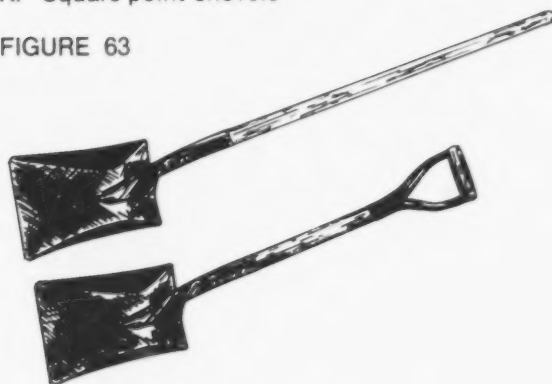
FIGURE 62



INFORMATION SHEET

K. Square-point shovels

FIGURE 63



XIII. Basic rules concerning care of the level

- A. *Do not* tap level with other tools
- B. Protect wooden level by using linseed oil on it regularly
- C. Keep windows clean
- D. *Do not* use level as a pry bar
- E. Always position level so that it will not be knocked over
- F. Always store level in a safe place
- G. Check accuracy of level regularly

XIV. Basic rules concerning care of hand tools

- A. Keep all tools clean
- B. Keep brick hammer sharp and square
- C. Keep folding rules oiled
- D. Keep chisel blade sharp and free of burrs
- E. Keep all tool handles tight

(NOTE: *Never* leave wooden-handled tools submerged in water.)

XV. Safety rules pertaining to hand tools

- A. Use the right tool for the job
- B. *Do not* use trowel for hammer

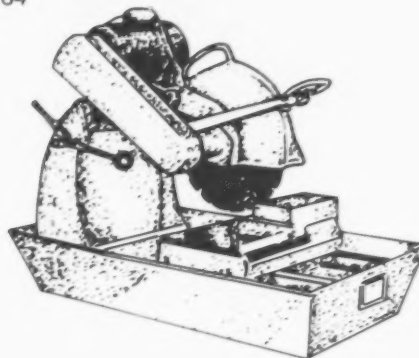


INFORMATION SHEET

- C. *Do not* hammer on level
 - D. Wear safety goggles when cutting or chipping
 - E. *Do not* use broken or defective tools
 - F. *Do not* cut reinforcement with brick hammer, chisel, or trowel
 - G. Devote full attention to the task being performed
- XVI. Terms and definitions associated with power tools
- A. **Bind** — To restrict movement
 - B. **Fracture** — To damage or destroy by breaking or cracking
 - C. **Masonry saw** — Power-driven equipment used for cutting masonry units
 - D. **Mortar mixer** — Machine used for mixing mortar
 - E. **Raggle** — Groove in masonry unit into which metal flashing is fitted; groove made to receive adjoining material
 - F. **Step-cutting** — Passing material beneath saw blade with rapid, full-length strokes at approximately 50 to 60 strokes per minute
 - G. **Tuck-pointing** — Replacing old mortar in joints or patching joints with new mortar
 - H. **Water curtain** — Rubberized material attached to masonry saw just behind blade to prevent blade from throwing water onto motor
- XVII. Power tools and their uses (Figures 64-72)
- A. Masonry saws — Cutting masonry units

EXAMPLE:

FIGURE 64

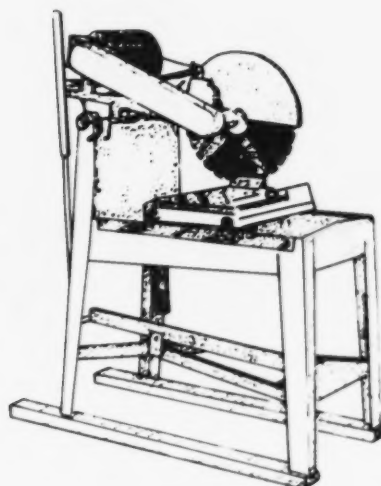


PORTABLE

INFORMATION SHEET

EXAMPLE:

FIGURE 65

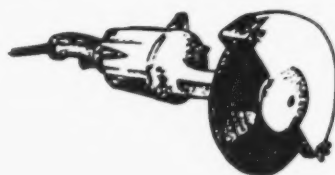


STATIONARY

B. Tuck-pointer grinder — Removing mortar from joints and cutting raggle

EXAMPLE:

FIGURE 66

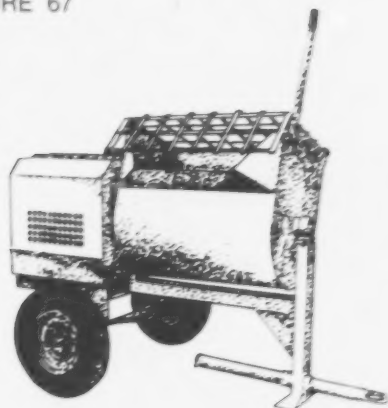


INFORMATION SHEET

C. Mortar mixer — Mixing mortar

EXAMPLE:

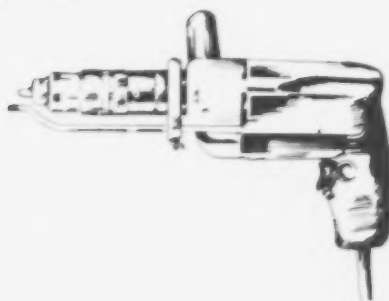
FIGURE 67



D. Hammer drill — Drilling holes and chipping

EXAMPLE:

FIGURE 68

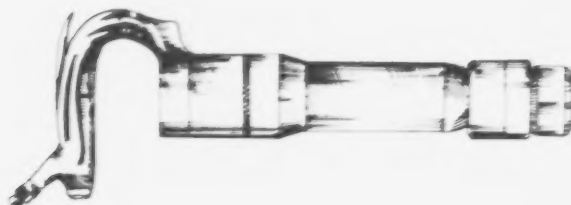


INFORMATION SHEET

E. Air hammer — Chipping and cutting holes

EXAMPLE:

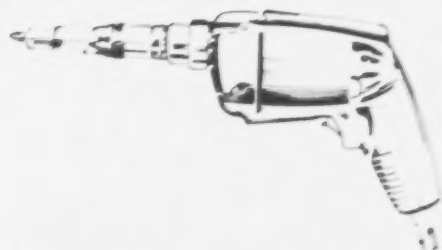
FIGURE 69



F. Drywall screwdriver — Attaching anchors and ties

EXAMPLE:

FIGURE 70



G. Pneumatic caulking gun — Applying caulking and sealants

EXAMPLE:

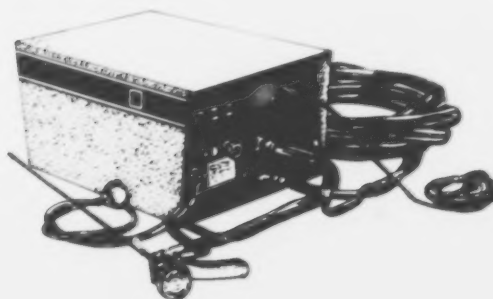
FIGURE 71



H. Pressure cleaner — Washing masonry and cleaning equipment

EXAMPLE:

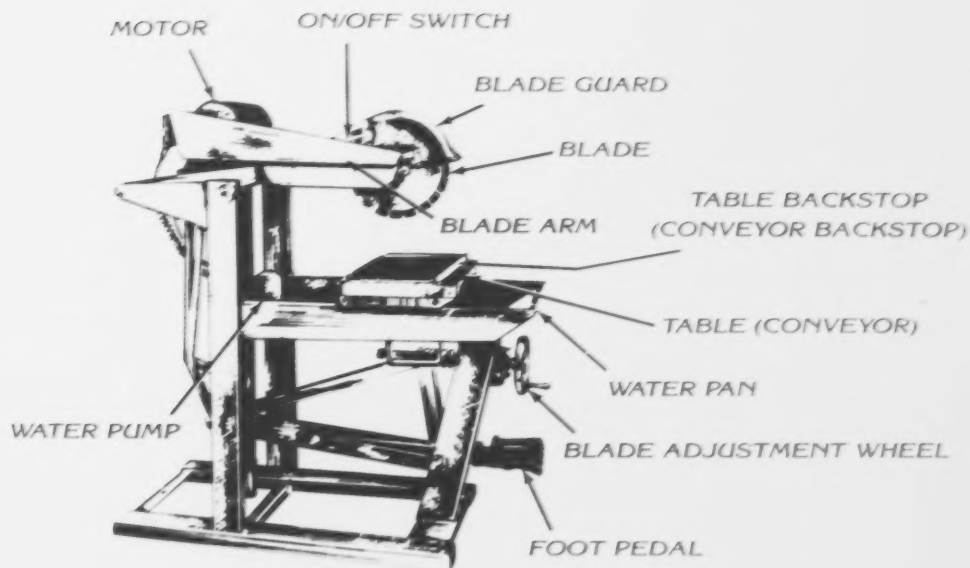
FIGURE 72



INFORMATION SHEET

XVIII. Parts of a masonry saw

FIGURE 73



XIX. Types of cutting blades used on masonry saws

(NOTE: There are fast-cutting, standard, and long-life styles of each type of cutting blade. See manufacturer's recommendations for the proper blade style for various cutting procedures. The type and style of blade used will depend on the hardness of the material being cut.)

- A. Diamond blade for wet cutting
- B. Abrasive blade for dry cutting
- C. Combination blades for wet or dry cutting

XX. Factors to consider when caring for a masonry saw

- A. Keep dust removed from saw
- B. Keep table clean and free of debris
- C. Keep parts lubricated

INFORMATION SHEET

- D. Keep water pan free of debris
 - E. Clean water pan and pump daily
 - F. Check table wheels and wheel adjustment weekly
- XXI. Safety rules pertaining to the use of a masonry saw
- A. Wear goggles, gloves, and respirator or dust mask when dry cutting
 - B. Wear goggles, rubber gloves, and rubber apron when wet cutting
 - C. Keep hands away from blade
 - D. Keep work area clean
 - E. Inspect blade for damage before installing
 - F. Clean and inspect blade-shaft collars and arbors before installing blade
 - G. Tighten nut on blade shaft just enough to hold blade securely; *do not* over-tighten
 - H. Operate blade within specified maximum operating speed
 - I. Stand to outside of blade path when starting saw
 - J. Hold materials securely when making cuts



BRICKLAYING TOOLS
UNIT II

ASSIGNMENT SHEET #1 — HOLD A BRICK TROWEL CORRECTLY

NAME _____

SCORE _____

A bricklayer must know how to hold a brick trowel correctly in order to perform necessary tasks properly.

Using your own trowel or one supplied by the instructor, practice the following steps until the trowel feels comfortable and natural in your hand.



CORRECT RIGHT-HANDED GRIP



CORRECT LEFT-HANDED GRIP

- A. Grasp handle of brick trowel with fingers on underside of handle
- B. Place thumb on top of ferrule, pointing toward tip of blade
- C. Hold handle with a firm yet flexible grip
- D. Apply pressure between thumb and forefinger



BRICKLAYING TOOLS
UNIT II

TEST

NAME _____

SCORE _____

1. Match terms associated with bricklaying tools to their definitions. Write the correct numbers in the blanks.

_____a. Adjustable rigid pole with line holder; used as a guide rather than building corners for a guide

1. Corner pole
2. Story pole
3. Line pin

_____b. To apply a thin coating of mortar or plaster to masonry

1. Temper
2. Rake
3. Parge

_____c. Metal device used for securing mason's line at both ends of course height

1. Rake
2. Line pin
3. Corner pole

_____d. Tool designed for moving or carrying several bricks

1. Wheel barrow
2. Rake
3. Brick tongs

_____e. Reel-type container holding chalk and line; line is pulled out and used to lay out and mark lines on floor for first course of brick or block

1. Chalk box and line
2. Line pin
3. Mason's line

_____f. Tool used to apply, spread, shape, and smooth mortar when laying brick or block

1. Jointer
2. Trowel
3. Rake

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TEST

- ____g. Metal band around the handle of a trowel
1. Bracket
 2. Ferrule
 3. Bracelet
- ____h. Platform or pan used to hold mortar at a convenient location and height for use by bricklayer
1. Mortarboard or pan
 2. Hawk
 3. Hod
- ____i. Pole or rod upon which are indicated all of the masonry courses and openings, such as windows or doors, required in the job
1. Story pole
 2. Corner pole
 3. Leveling rod
- ____j. To remix mortar to make it more workable
1. Mix
 2. Adjust
 3. Temper
- ____k. Wood or plastic device used to keep mason's line tight
1. Line block
 2. Line pin
 3. Line twig
- ____l. Sloping surface against which the end of an arch rests; may be brick cut on an angle
1. Sill
 2. Skewback
 3. Abutment
- ____m. Metal device designed to rake out and shape mortar joints
1. Pointing trowel
 2. Rake
 3. Tuck-pointer

TEST

2. Distinguish between modular spacing rule and standard brick spacing rule. Write an "M" in the blank before modular spacing rule and a "B" in the blank before brick spacing rule.

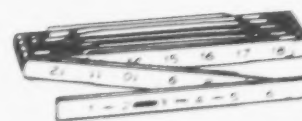
____ a. Used for spacing course height of modular materials

____ b. Used for spacing nonmodular brick course height

3. Identify basic hand tools included in a bricklayer's beginner's tool kit. Write the correct names in the blanks.

All-purpose brush
Brick spacing rule
Concave jointer
Brick trowel
Brick hammer
48-inch level

Utility knife
Brick set
Mason's line
Tool bag
Line blocks
Pointing trowel



a. _____ b. _____ c. _____



d. _____ e. _____



f. _____ g. _____ h. _____



TEST



i. _____



j. _____



k. _____



l. _____

4. Match types of hammers to their specific uses. Write the correct numbers in the blanks. Answers may be used more than once.

- | | |
|--|------------------------|
| _____ a. Setting line pins | 1. Brick hammer |
| _____ b. Facing block or stone | 2. Mash |
| _____ c. Cutting tile | 3. Stonemason's hammer |
| _____ d. Nailing wall ties | 4. Tile hammer |
| _____ e. Cutting and splitting stone | 5. Bushhammer |
| _____ f. Cutting bricks or blocks | |
| _____ g. Striking brick set or other chisels | |
| _____ h. Cutting off fins or projections | |

5. Match types of chisels to their specific uses. Write the correct numbers in the blanks.

- | | |
|---|-------------------------------|
| _____ a. Chipping mortar from joints | 1. Brick set |
| _____ b. Cutting soft stone | 2. Mason's chisel |
| _____ c. Cutting brick or block | 3. Tooth chisel |
| _____ d. Sizing, trimming, and facing hard stone; cutting heavy stone | 4. Plugging chisel |
| _____ e. Cutting brick, block, and veined stone | 5. Rubber-grip mason's chisel |
| _____ f. Cushioning blow while cutting brick, block, or stone | 6. Pitching tool |

TEST

6. Match types of squares to their specific uses. Write the correct numbers in the blanks. Answers may be used more than once.

- | | |
|---|------------------|
| _____a. Laying out corners | 1. Bevel |
| _____b. Marking straight cuts | 2. Steel framing |
| _____c. Marking skewbacks | 3. Combination |
| _____d. Marking cuts of various angles | |
| _____e. Checking square of corner units | |

7. Match types of jointers to their specific uses. Write the correct numbers in the blanks. Some blanks may contain more than one answer.

- | | |
|--|--|
| _____a. Compressing joints | 1. Caulking Trowel (tuck-pointer) |
| _____b. Creating attractive joint design | 2. Concave jointer and sled-runner concave jointer |
| _____c. Weatherproofing joints | 3. Rake and skate-wheel rake |
| _____d. Pointing joints | 4. Flat jointer |
| _____e. Raking out joints and leaving the desired finish | 5. V-jointer and sled-runner V-jointer |
| _____f. Shaping joints | |
| _____g. Giving concave appearance to joints | |
| _____h. Giving a V-design to joints | |

8. Match types of trowels to their specific uses. Write the correct numbers in the blanks.

- | | |
|--|----------------------------|
| _____a. Pointing, grouting, and mixing mortar | 1. Brick |
| _____b. Pointing, caulking, and tooling joints | 2. Pointing |
| _____c. Spreading mortar for laying brick, block and stone | 3. Caulking (tuck-pointer) |
| _____d. Plastering and parging mortar or waterproofing onto wall; applying base coat for tile and veneer | 4. Margin |
| _____e. Mixing mortar, grout, and waterproofing in small amounts | 5. Plastering |



TEST

9. Name five factors to consider when selecting a brick trowel.

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

10. Identify and describe the correct way to hold a brick trowel. Write an "X" in the blank below the correct illustration, then write a brief description.

a. Identify



1. _____ 2. _____ 3. _____

b. Describe

1. _____
2. _____
3. _____
4. _____

TEST

11. Identify tools used in determining course alignment. Write the correct names in the blanks.

Line twig
Steel tapes
Corner pole
Story pole

Line blocks
Corner blocks
Marking crayon and pencil
Mason's line

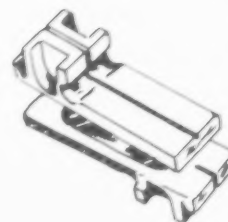
48-inch level
Line pins
Chalk box and line



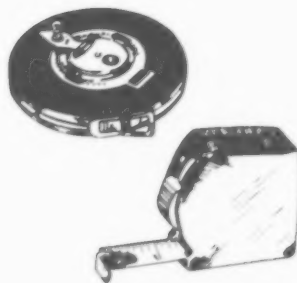
a. _____



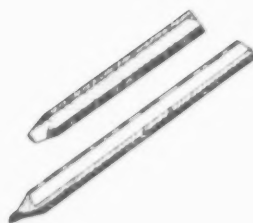
b. _____



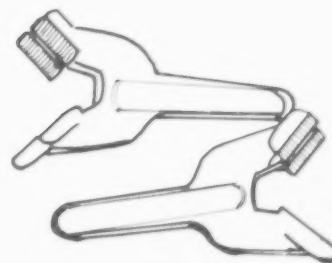
c. _____



d. _____



e. _____

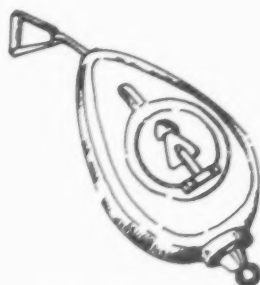
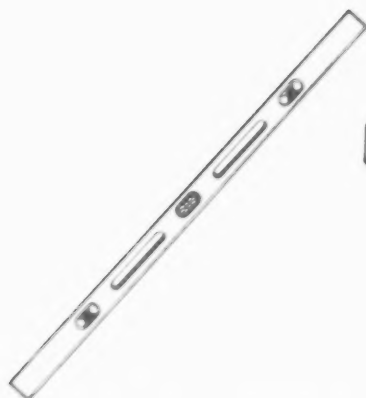


f. _____

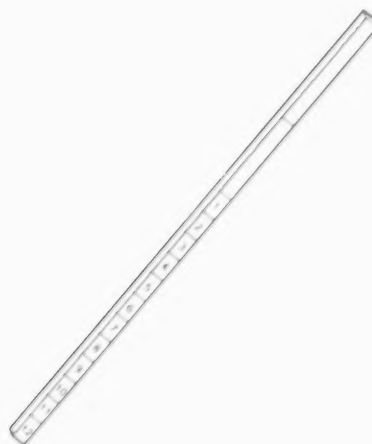


G-1

TEST



g. _____ h. _____ i. _____



j. _____ k. _____

TEST

12. Identify the following tools and equipment related to bricklaying. Write the correct names in the blanks.

Wheelbarrow
Mortar box
Water bucket
Brick tongs

Mortarboard and stand
All-purpose brush
Square-point shovels
Brick and tile barrow

Rope and pulley
Mortar pan and stand
Bolt cutter



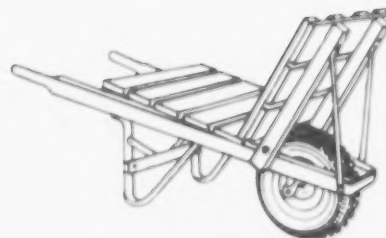
a. _____



b. _____

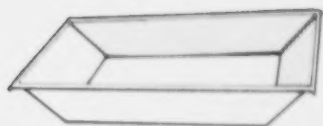


c. _____

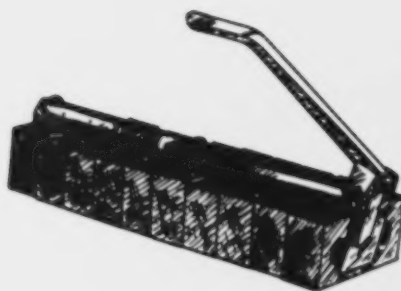


d. _____

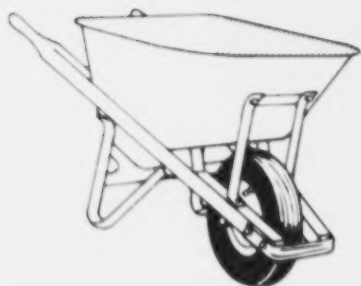
TEST



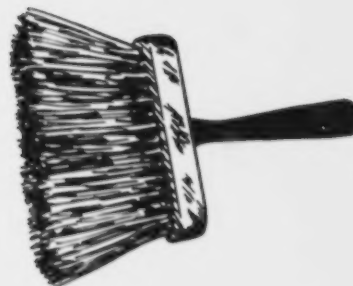
e. _____



f. _____

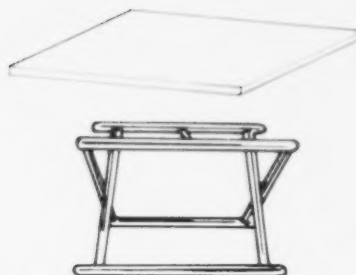
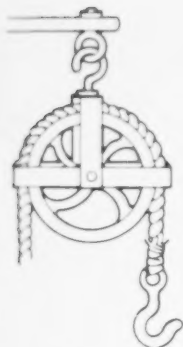


g. _____

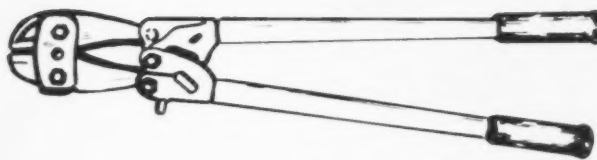


h. _____

TEST



i. _____ j. _____



k. _____

13. State four basic rules concerning care of the level.

- a. _____
- b. _____
- c. _____
- d. _____

14. State three basic rules concerning care of hand tools.

- a. _____
- b. _____
- c. _____



TEST

15. State five safety rules pertaining to hand tools.

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

16. Match terms associate with power tools to their definitions. Write the correct numbers in the blanks.

_____ a. To damage or destroy by breaking or cracking

- 1. Shatter
- 2. Fracture
- 3. Rupture

_____ b. Rubberized material attached to masonry saw just behind blade to prevent blade from throwing water onto motor

- 1. Motorguard
- 2. Blade guard
- 3. Water curtain

_____ c. Groove in masonry unit into which metal flashing is fitted; groove made to receive adjoining material

- 1. Cross web
- 2. Raggle
- 3. Joint

_____ d. To restrict movement

- 1. Bind
- 2. Hold
- 3. Anchor

_____ e. Replacing old mortar in joints or patching joints with new mortar

- 1. Re-jointing
- 2. Patching
- 3. Tuck-pointing

_____ f. Power driven equipment used for cutting masonry units

- 1. Masonry saw
- 2. Air hammer
- 3. Hydraulic splitter

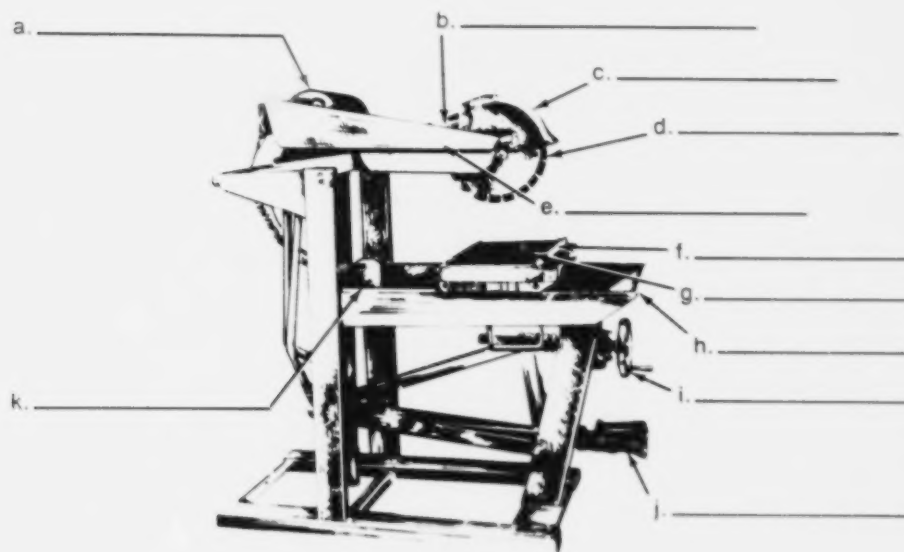
TEST

- _____g. Passing material beneath saw blade with rapid, full length strokes at approximately 50 to 60 strokes per minute
1. Step-cutting
 2. Quick-cutting
 3. Joint cutting
- _____h. Machine used for mixing mortar
1. Drill motor and paddle
 2. Mortar mixer
 3. Mortar pump
17. Match power tools to their specific uses. Write the correct numbers in the blanks. Some numbers may be used more than once and some blanks may contain more than one answer.
- | | |
|-------------------------------------|---------------------------|
| _____a. Cutting holes | 1. Tuck-pointer grinder |
| _____b. Cutting raggle | 2. Hammer drill |
| _____c. Cutting masonry units | 3. Pressure cleaner |
| _____d. Drilling holes | 4. Masonry saw |
| _____e. Washing masonry | 5. Pneumatic caulking gun |
| _____f. Removing mortar from joints | 6. Air hammer |
| _____g. Chipping | 7. Mortar mixture |
| _____h. Attaching anchors and ties | 8. Drywall screwdriver |
| _____i. Applying caulking | |
| _____j. Cleaning equipment | |
| _____k. Mixing mortar | |
| _____l. Applying sealants | |



TEST

18. Label the parts of the masonry saw illustrated below.



19. Name types of cutting blades used on masonry saws.

a. _____

b. _____

c. _____

20. List four factors to consider when caring for a masonry saw.

a. _____

b. _____

c. _____

d. _____

TEST

21. State seven safety rules pertaining to the use of a masonry saw.

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____
- f. _____
- g. _____



BRICKLAYING TOOLS
UNIT II

ANSWERS TO TEST

1. a. 1 e. 1 i. 1 m. 2
b. 3 f. 2 j. 3
c. 2 g. 2 k. 1
d. 3 h. 1 l. 2
2. a. M
b. B
3. a. Mason's line g. Brick set
b. Line blocks h. Tool bag
c. Brick spacing rule i. Brick hammer
d. 48-inch level j. Pointing trowel
e. Concave jointer k. All-purpose brush
f. Brick trowel l. Utility knife
4. a. 1 e. 3
b. 5 f. 1
c. 4 g. 2
d. 1 h. 1
5. a. 4 d. 6
b. 3 e. 2
c. 1 f. 5
6. a. 2 d. 1, 3
b. 3 e. 2
c. 1
7. a. 1, 2, 4, 5 e. 5
b. 5 f. 1, 4
c. 2, 5 g. 2
d. 1 h. 5
8. a. 2 d. 5
b. 3 e. 4
c. 1



ANSWERS TO TEST

9. Answer should include any five of the following.
- a. Balance
 - b. Shape of blade
 - c. Weight
 - d. Size
 - e. Flexibility of blade
 - f. Quality of steel
 - g. Angle of blade in relation to handle
 - h. Type of handle
10. a. 1
- b. Description should include the following.
- 1. Grasp handle of trowel with fingers on underside of handle
 - 2. Place thumb on top of ferrule, pointing toward tip of blade
 - 3. Hold handle with a firm yet flexible grip
 - 4. Apply pressure between thumb and forefinger
11. a. Corner pole
- b. Line twig
- c. Line blocks
- d. Steel tapes
- e. Marking crayon and pencil
- f. Corner blocks
- g. 48-inch level
- h. Chalk box and line
- i. Line pins
- j. Mason's line
- k. Story pole
12. a. Mortar pan and stand
- b. Square-point shovels
- c. Water bucket
- d. Brick and tile barrow
- e. Mortar box
- f. Brick tongs
- g. Wheelbarrow
- h. All-purpose brush
- i. Rope and pulley
- j. Mortarboard and stand
- k. Bolt cutter
13. Answer should include any four of the following.
- a. *Do not* tap level with other tools
 - b. Protect wooden level by using linseed oil on it regularly
 - c. Keep windows clean
 - d. *Do not* use level as a pry bar
 - e. Always position level so that it will not be knocked over
 - f. Always store level in a safe place
 - g. Check accuracy of level regularly

ANSWERS TO TEST

14. Answer should include any three of the following.

- a. Keep all tools clean
- b. Keep brick hammer sharp and square
- c. Keep folding rules oiled
- d. Keep chisel blade sharp and free of burrs
- e. Keep all tool handles tight

15. Answer should include any five of the following.

- a. Use the right tool for the job
- b. *Do not* use trowel for hammer
- c. *Do not* hammer on level
- d. Wear safety goggles when cutting or chipping
- e. *Do not* use broken or defective tools
- f. *Do not* cut reinforcement with brick hammer, chisel, or trowel
- g. Devote full attention to the task being performed

16. a. 2 c. 2 e. 3 g. 1
b. 3 d. 1 f. 1 h. 2

17. a. 6 d. 2 g. 2, 6 j. 3
b. 1 e. 3 h. 8 k. 7
c. 4 f. 1 i. 5 l. 5

18. a. Mortar g. Table (conveyor)
b. On/off switch h. Water pan
c. Blade guard i. Blade adjustment wheel
d. Blade j. Foot pedal
e. Blade arm k. Water pump
f. Table backstop (conveyor backstop)

19. a. Diamond blade for wet cutting
b. Abrasive blade for dry cutting
c. Combination blades for wet or dry cutting

20. Answer should include any four of the following.

- a. Keep dust removed from saw
- b. Keep table clean and free of debris
- c. Keep parts lubricated
- d. Keep water pan free of debris
- e. Clean water pan and pump daily
- f. Check table wheels and wheel adjustment weekly



ANSWERS TO TEST

21. Answer should include any seven of the following.
- a. Wear goggles, gloves, and respirator or dust mask when dry cutting
 - b. Wear goggles, rubber gloves, and rubber apron when wet cutting
 - c. Keep hands away from blade
 - d. Keep work area clean
 - e. Inspect blade for damage before installing
 - f. Clean and inspect blade-shaft collars and arbors before installing blade
 - g. Tighten nut on blade shaft just enough to hold blade securely; *do not* overtighten
 - h. Operate blade within specified maximum operating speed
 - i. Stand to outside of blade path when starting saw
 - j. Hold materials securely when making cuts

BRICKLAYING LAYOUT
UNIT III

UNIT OBJECTIVE

After completing this unit, the student should be able to lay out walls. The student will show this ability by completing job sheets and unit test with a minimum score of 80 percent.

SPECIFIC OBJECTIVES

After completing this unit, the student should be able to

1. Match terms associated with bricklaying layout to their definitions.
2. State the purposes of wall layout.
3. Arrange in order the procedures for laying out a wall.
4. Name methods of layout.
5. Discuss purposes of bonds.
6. Label types of wall bonds.
7. Distinguish between load-bearing and non-load-bearing walls.
8. State purpose of through-wall bonding.
9. Label types of through-wall bonding.
10. State purposes of leads.
11. Name types of leads.
12. Demonstrate the ability to
 - a. Use framing square to lay out an 8-inch wall corner.
 - b. Use a level.
 - c. Lay out a section of wall.
 - d. Lay out a section of wall containing openings.



BRICKLAYING LAYOUT
UNIT III

SUGGESTED ACTIVITIES

I. Unit contents

- A. Objective sheet
- B. Suggested activities
- C. Information sheet
- D. Job sheets
 - 1. Job Sheet #1 — Use a Framing Square to Lay Out an 8-Inch Wall Corner
 - 2. Job Sheet #2 — Use a Level
 - 3. Job Sheet #3 — Lay Out a Section of Wall
 - 4. Job Sheet #4 — Lay Out a Section of Wall Containing Openings
- E. Test
- F. Answers to test

II. Instructor's guide

- A. Review unit and plan presentation.
- B. Obtain tools and materials necessary to perform procedures outlined in job sheets.
- C. Introduce unit to students.
 - Discuss layout methods and procedures.
 - Discuss purposes and types of wall bonds.
 - Discuss purposes and types of leads.
- D. Provide students with objective sheet.
- E. Discuss unit and specific objectives.
- F. Provide students with information and job sheets.
- G. Discuss information and job sheets.



SUGGESTED ACTIVITIES

1. Use Information Sheet, Section I, to discuss terms and definitions associated with bricklaying layout.
 - Point out the importance of knowing and understanding the terms and definitions.
 - Use as many samples of the actual items as possible to supplement your explanation of each term.
2. Use Information Sheet, Sections II and III, to discuss the purposes and procedures for laying out walls.
 - Discuss the purposes of wall layout.
 - Demonstrate procedures for laying out a wall.
 - Give each student the opportunity to demonstrate the procedures for laying out a wall.
 - Relate these procedures to the procedures in the job sheets.
3. Use Information Sheet, Section IV, to discuss methods of layout.
 - Demonstrate the different methods of layout.
 - Have students demonstrate and identify the methods of layout.
4. Use Information Sheet, Sections V and VI, to discuss purposes and types of wall bonds.
 - Discuss purposes of bonds.
 - Show examples of the various types of wall bonds and have students identify each type.
 - Demonstrate laying out the different methods using dry bond.
 - Have students demonstrate the different wall bonds using dry bond method.
5. Use Information Sheet, Section VII, to discuss load-bearing and non-load-bearing walls.
 - Discuss the purpose of load-bearing walls.
 - Discuss the purpose of non-load-bearing walls.
 - Have students identify load-bearing and non-load-bearing walls.

SUGGESTED ACTIVITIES

6. Use Information Sheet, Sections VIII and IX, to discuss types and purposes of through-wall bonding.
 - Show students illustrations of through-wall bonding and have them identify the different methods.
 - Discuss the purposes of using one method of through-wall bonding in preference to another.
7. Use Information Sheet, Sections X and XI, to discuss types and purposes of leads.
 - Discuss the purposes of leads.
 - Show students illustrations of different types of leads and have them identify the different types.
 - Discuss procedures for laying up leads.
8. Demonstrate procedures in the job sheets.
 - Have students demonstrate procedures in job sheets.
 - Have students complete Job Sheets #1 through #4.

H. Give test.

I. Critique test and discuss in class.

J. Reteach and retest as necessary.

K. Complete appropriate sections of competency profile.

(NOTE: A master of the competency profile for this book is provided at the front of the instructor edition. You may duplicate the profile and distribute it to students as needed.)

- III. Unit reference — Hendrix, Laborn J. "Bud." *Bricklaying Curriculum — Principles of Bricklaying*. Stillwater, Oklahoma: State Department of Vocational and Technical Education/Curriculum and Instructional Materials Center, and The Associated General Contractors of America, 1984.



BRICKLAYING LAYOUT
UNIT III

INFORMATION SHEET

- I. Terms and definitions associated with bricklaying layout
- A. **Brick bond** — Pattern in which bricks are laid
 - B. **Cavity** — Air space or opening between two wythes of masonry units
 - C. **Dry bond** — Method of determining brick bond by laying brick without mortar
 - D. **Grout** — Thin mixture of mortar; poured into wall cavity for bonding purposes
 - E. **Grouted masonry** — Masonry in which the cavity is filled with grout
 - F. **Keel** — Construction crayon
 - G. **Lead** — Section of wall built up and raked back on successive courses
 - H. **Lintel** — Horizontal member placed over wall openings to support the weight of masonry above
 - I. **Load-bearing wall** — Wall that not only supports itself but the structure above
 - J. **Non-load-bearing wall** — Wall that supports only its own weight
 - K. **Parging** — Plastering masonry walls with mortar
 - L. **Rack** — To set back the end of each course from the end of preceding course
 - M. **Reinforced masonry** — Unit of masonry in which reinforcement is embedded to give additional strength to wall
 - N. **Scaffold** — Temporary structure or platform to support workers and material during construction
 - O. **Scaffold-high** — High enough to use a scaffold to continue construction
 - P. **Story pole** — Length of wood marked for course levels and/or heights and openings
 - Q. **Strike** — To tool joints
 - R. **Through-wall bonding** — Method of bonding by joining outer and inner walls
 - S. **Wythe** — Continuous section of masonry one unit in thickness



INFORMATION SHEET

II. Purposes of wall layout

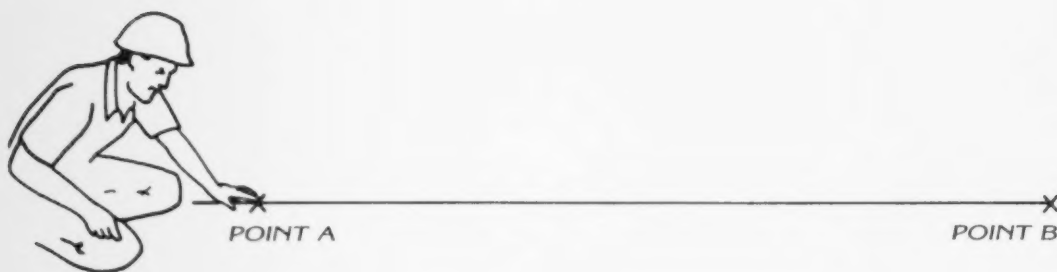
- A. Establishing wall locations
- B. Establishing bonds
- C. Establishing openings
- D. Establishing elevations

III. Procedures for laying out a wall

- A. Locate reference points (A and B) for wall line
- B. Snap a chalk line from point A to point B (Figure 1)

EXAMPLE:

FIGURE 1



- C. Establish opposite side of wall by marking points on a line parallel to chalk line by a distance of proposed wall thickness (Figure 2)

EXAMPLE:

FIGURE 2



INFORMATION SHEET

- D. Snap a chalk line between these two new points

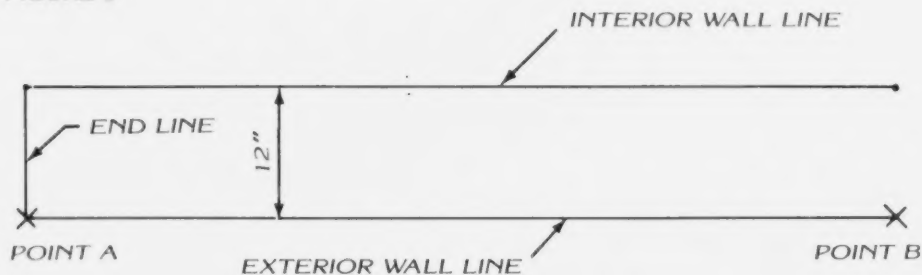
(NOTE: These two chalk lines should be parallel to each other.)

- E. Use framing square to square from point A across to second line (Figure 3)

(NOTE: This will establish end of wall and starting point for first unit.)

EXAMPLE:

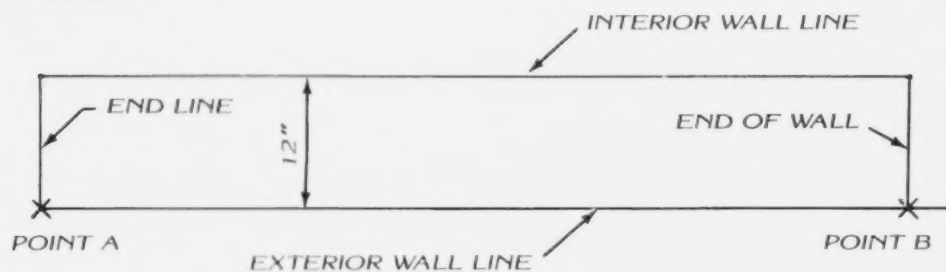
FIGURE 3



- F. Measure from point A (starting point) to end of wall; square a mark at this point (Figure 4)

EXAMPLE:

FIGURE 4



INFORMATION SHEET

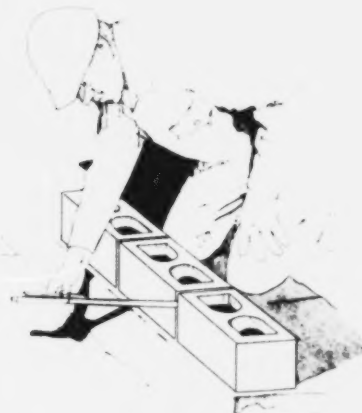
IV. Methods of layout

A. Dry bonding (Figures 5 and 6)

FIGURE 5



FIGURE 6



B. Steel tape bonding (Figures 7 and 8)

FIGURE 7



FIGURE 8



INFORMATION SHEET

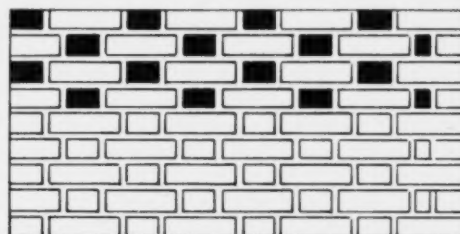
V. Purposes of bonds

- A. Adding strength and rigidity to the wall
- B. Beautifying through design and economy of design

VI. Types of wall bonds (Figures 9-16)

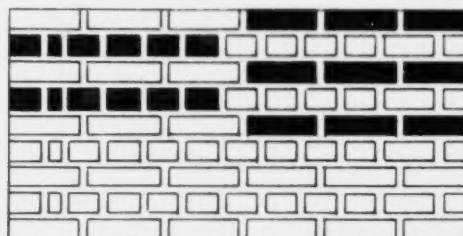
A. Flemish

FIGURE 9



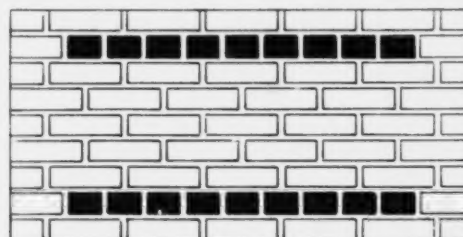
B. English

FIGURE 10



C. Common or full header

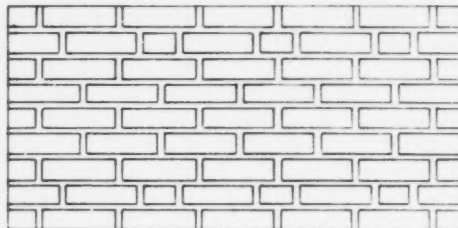
FIGURE 11



INFORMATION SHEET

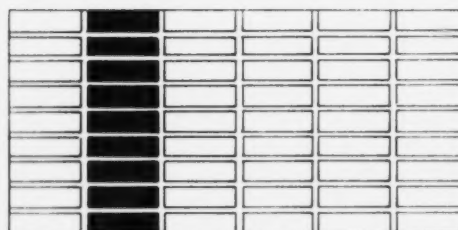
D. Common or Flemish header

FIGURE 12



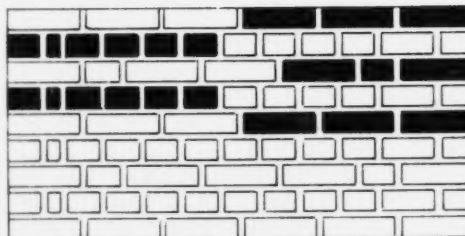
E. Stack

FIGURE 13



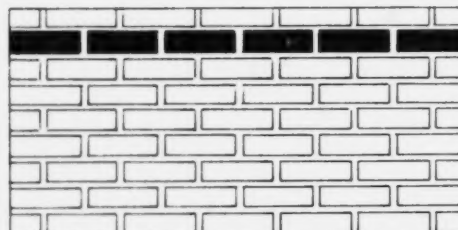
F. English cross or Dutch

FIGURE 14



G. Running

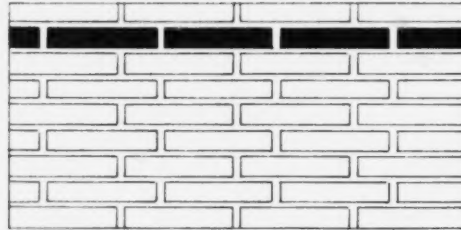
FIGURE 15



INFORMATION SHEET

H. One-third running

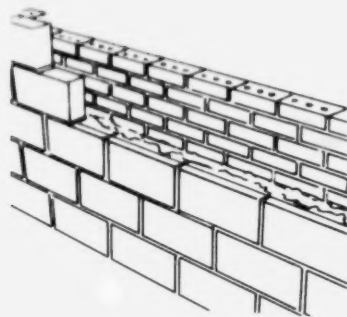
FIGURE 16



VII. Load-bearing and non-load-bearing walls

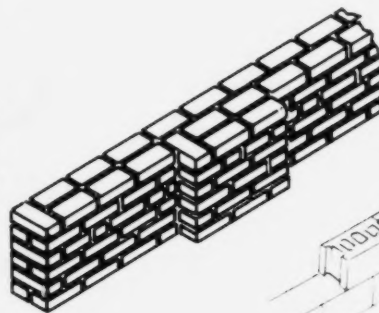
A. Load-bearing (Figures 17-19)

FIGURE 17



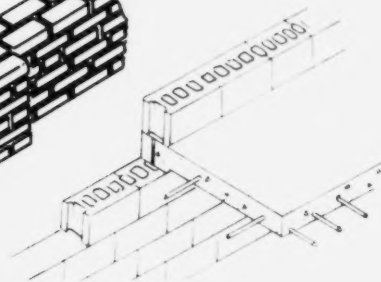
BRICK AND BLOCK

FIGURE 18



BRICK

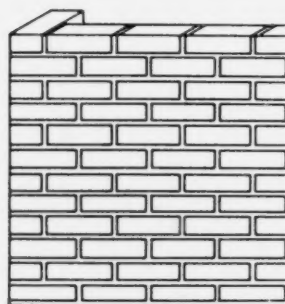
FIGURE 19



BLOCK

B. Non-load-bearing (Figures 20 and 21)

FIGURE 20



BRICK

FIGURE 21



BLOCK



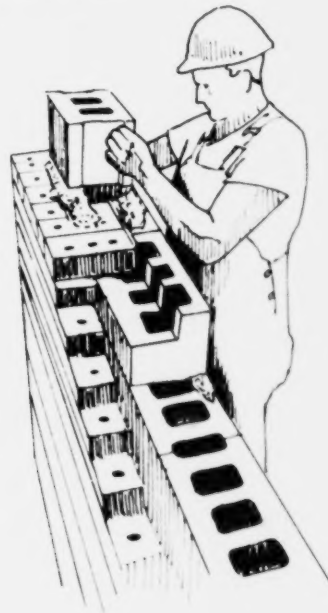
INFORMATION SHEET

VIII. Purpose of through-wall bonding — Joining outer and inner wythes to strengthen wall

IX. Types of through-wall bonding (Figures 22-24)

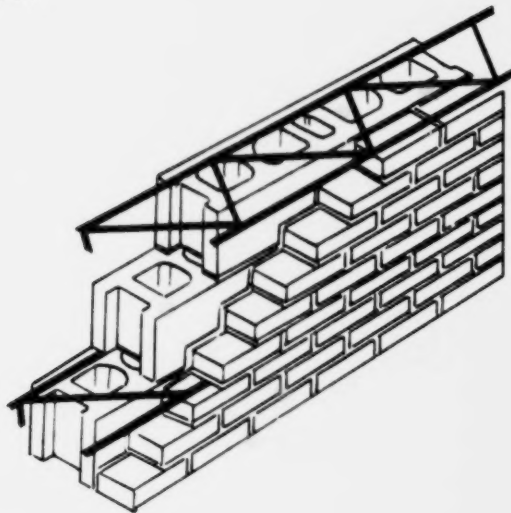
A. Header construction

FIGURE 22



B. Joint reinforcement or heavy-gauge ties

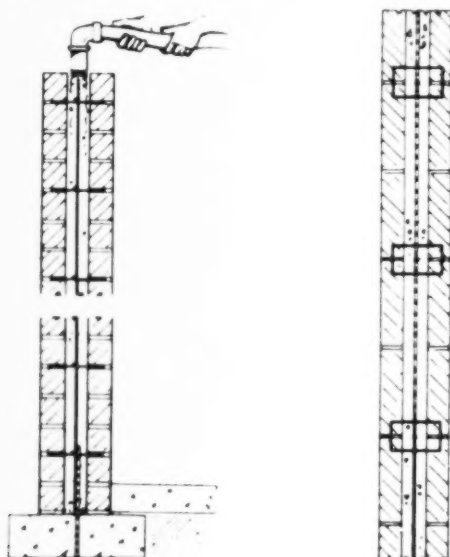
FIGURE 23



INFORMATION SHEET

C. Grouting and reinforcement

FIGURE 24



X. Purposes of leads

- A. Maintaining proper elevation
- B. Establishing wall pattern
- C. Acting as a guide for wall construction

INFORMATION SHEET

XI. Types of leads (Figures 25-28)

A. Outside corner

EXAMPLE:

FIGURE 25



B. Angle or inside corner

EXAMPLE:

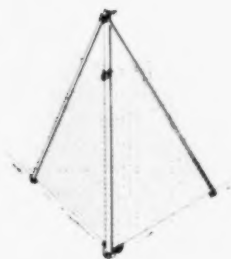
FIGURE 26



C. Corner Pole

EXAMPLE:

FIGURE 27



D. Rack back

EXAMPLE:

FIGURE 28

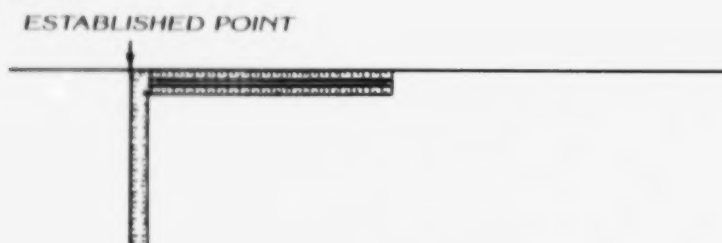


BRICKLAYING LAYOUT UNIT III

JOB SHEET #1 — USE A FRAMING SQUARE TO LAY OUT AN 8-INCH WALL CORNER

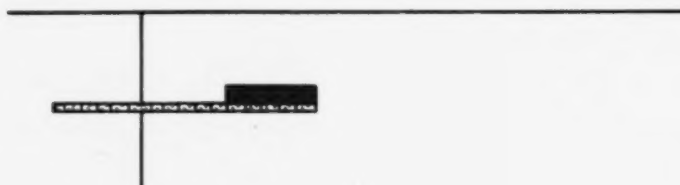
- I. Equipment and materials
 - A. Framing square
 - B. Pencil
 - C. Rule or tape
- II. Procedure
 - A. Use framing square to square off of an established point on a line (Figure 29)

FIGURE 29



- B. Mark line along edge of square to establish a square corner
- C. Measure over 8 inches from this line, and make a small mark (Figure 30)

FIGURE 30



JOB SHEET #1

- D. Use square to square small mark with established line
- E. Mark line along the edge of square

(NOTE: This establishes a square corner for an 8-inch wall.)

- F. Have instructor inspect your work
- G. Put away tools and equipment

BRICKLAYING LAYOUT UNIT III

JOB SHEET #2 — USE A LEVEL

I. Equipment and materials

- A. Levels, various lengths
- B. Vertical and horizontal work surfaces
- C. Pencil
- D. Tape
- E. Straightedge

II. Procedure for leveling

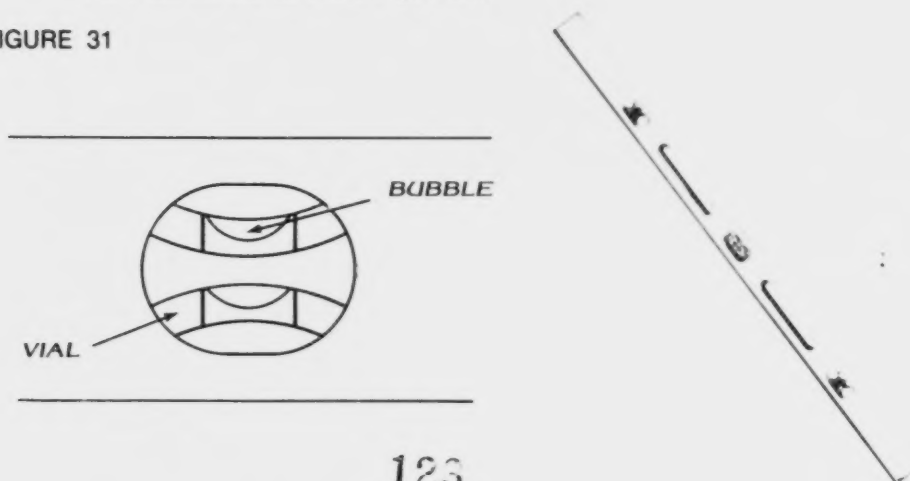
A. Check level for accuracy

(NOTE: Levels are very delicate instruments and must be handled carefully to ensure accuracy. Levels should be checked for accuracy before use, especially if the instrument has been dropped or jarred.)

1. Set base of level on flat, horizontal surface
2. Check bubble position in horizontal vial
3. Adjust surface or location of level until bubble is centered; mark position on surface

(NOTE: On a level surface, the bubble will lie evenly positioned between the lines on the vial. See Figure 31.)

FIGURE 31



JOB SHEET #2

4. Rotate the level end-for-end and position it in the exact location as the bubble-centered reading (Figure 32)

FIGURE 32



5. Check bubble position in the horizontal vial

(NOTE: The bubble will be centered from this side also if the level is accurate.)

6. Replace or repair level as necessary

B. Level a surface

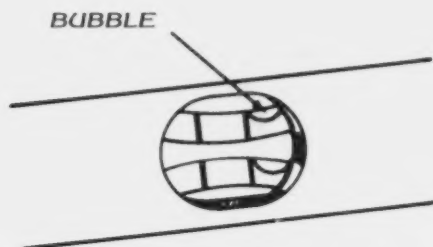
1. Visually check surface for irregularities and foreign matter such as dirt

(NOTE: Even small surface irregularities or particles can cause inaccurate readings in the level.)

2. Clean or replace surface as necessary
3. Set base of level carefully and squarely on surface
4. Check bubble position

(NOTE: The bubble will be displaced toward the high end of the level. See Figure 33)

FIGURE 33



JOB SHEET #2

5. Adjust surface as necessary
6. Take additional readings to level surface as required

(NOTE: Many factors affect the number of readings required. These include type of surface, material being used, and others.)

III. Procedure for plumbing

A. Check level for accuracy

1. Place base of level against flat, vertical surface (See Figure 34)
2. Check bubble position in upper horizontal vial
3. Adjust surface or location of level until bubble is centered; mark position on surface
4. Rotate level end-for-end and position it in the exact location as that of the bubble-centered reading (Figure 35)

FIGURE 34



FIGURE 35



JOB SHEET #2

5. Check bubble position in the upper horizontal vial

(NOTE: The bubble will be centered at this end also if level is accurate.)

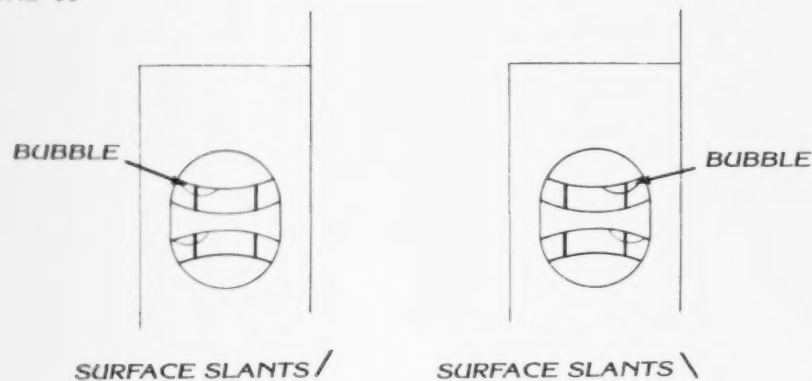
6. Replace or repair level as necessary

B. Plumb a surface

1. Visually check surface for irregularities and foreign matter such as dirt
2. Clean or replace surface as necessary
3. Place base of level carefully and squarely against surface
4. Check bubble position in upper vial

(NOTE: The bubble will move toward one end of the vial if the surface is not plumb. To plumb the surface, you must adjust it in the direction of bubble displacement. See Figure 36.)

FIGURE 36



5. Adjust surface as necessary
 6. Take additional readings to plumb as required
- C. Clean work area; put away tools and equipment

BRICKLAYING LAYOUT
UNIT III

JOB SHEET #3 — LAY OUT A SECTION OF WALL

- I. Equipment and materials
 - A. Steel tape, 50- or 100-foot
 - B. Bricklayer's modular rule
 - C. Framing square
 - D. Level, 4-foot
 - E. Chalk line
 - F. Mason's line
 - G. Heavy-duty marking pencil
 - H. Keel (marking crayon)
 - I. Specifications furnished by instructor

- II. Procedure

- A. Establish wall line

(NOTE: Some specifications call for the brick wall to be built first.)

- 1. Locate known reference points

(NOTE: Instructor in a laboratory situation should designate points for reference or starting points.)

- 2. Snap a chalk line from point A to point B (Figure 37)

(NOTE: This step establishes the exterior wall line.)

FIGURE 37

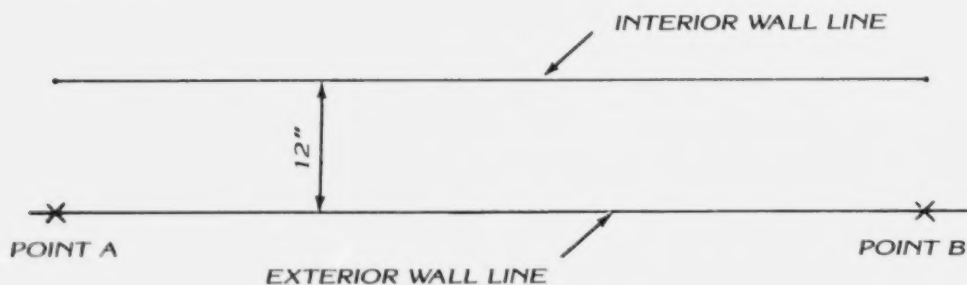


JOB SHEET #3

3. Establish interior wall line by measuring a distance of 12 inches from points A and B on exterior wall line (Figure 38)

(NOTE: The interior wall line should parallel the exterior wall line.)

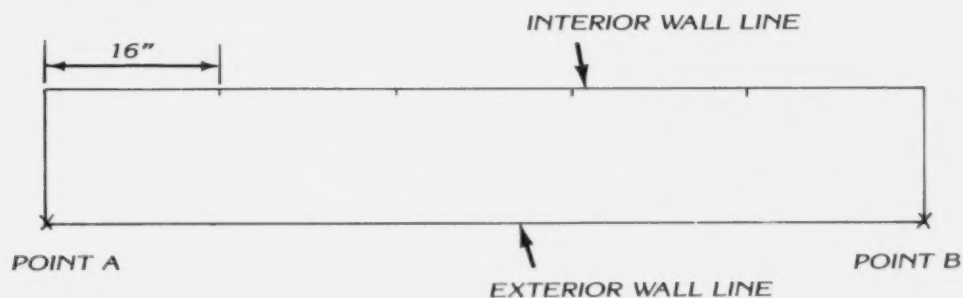
FIGURE 38



4. Establish both ends of wall by squaring end lines between interior and exterior wall lines at points A and B (See Figure 39)
5. With steel tape, measure and mark every 16 inches on interior wall line (Figure 39)

(NOTE: These marks indicate the block bond.)

FIGURE 39



- B. Have instructor evaluate layout
- C. Clean work area; clean and put away all tools and equipment

BRICKLAYING LAYOUT
UNIT IIIJOB SHEET #4 — LAY OUT A SECTION OF WALL
CONTAINING OPENINGS

- I. Equipment and materials
 - A. Steel tape, 50- to 100-foot
 - B. Bricklayer's modular rule
 - C. Framing square
 - D. Level, 4-foot
 - E. Chalk line
 - F. Mason's line
 - G. Heavy-duty marking pencil and keel
 - H. Specifications furnished by instructor

II. Procedure

A. Establish wall lines

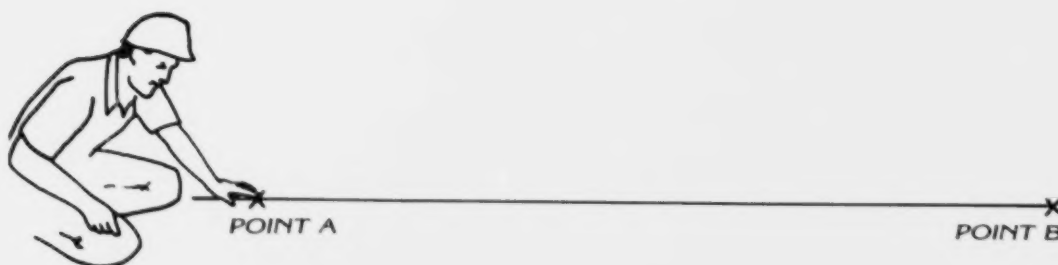
1. Locate known reference points

(NOTE: Instructor in a laboratory setting should designate points of reference or starting points.)

2. Snap a chalk line from point A to point B (Figure 40)

(NOTE: This step establishes the exterior wall line.)

FIGURE 40

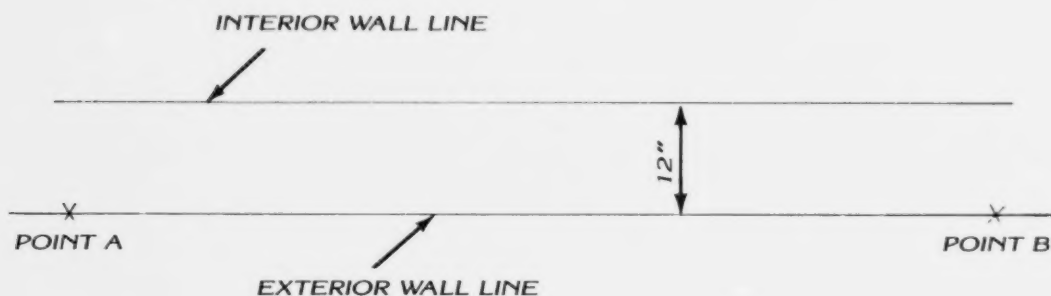


JOB SHEET #4

3. Establish interior wall line by measuring a distance of 12 inches from points A and B on exterior wall line (Figure 41)

(NOTE: This line should be parallel to the exterior wall line.)

FIGURE 41



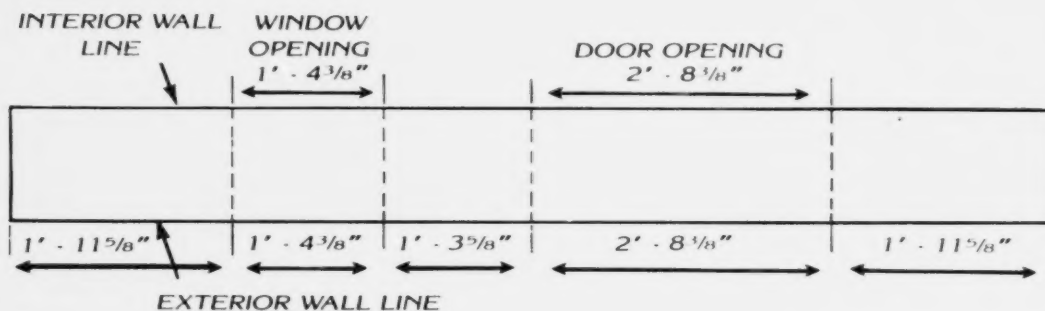
4. Square end lines between interior and exterior wall lines at points A and B
5. Check wall lines for dimension accuracy

B. Lay out block bond

1. Measure with steel tape and mark door opening as shown on plan (Figure 42)

(NOTE: When marking door opening, use a piece of keel or marking crayon.)

FIGURE 42



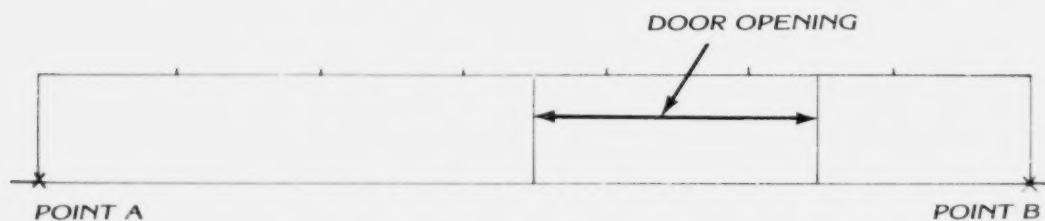
2. Square door opening from exterior to interior wall lines
- (NOTE: Mark door jamb with marking crayon.)

JOB SHEET #4

3. Measure with steel tape and mark block bond every 16 inches (Figure 43)

(NOTE: Mark block bond through door opening to end of wall. This will assure a good bond when blocks are laid across top of door opening.)

FIGURE 43



- C. Have instructor evaluate layout
D. Clean work area; clean and put away all tools and equipment



BRICKLAYING LAYOUT
UNIT III

TEST

NAME _____

SCORE _____

1. Match terms associated with bricklaying layout to their definitions. Write the correct numbers in the blanks. Definitions are continued on the next page.

- | | |
|---|---------------------------|
| _____a. Plastering masonry walls with mortar | 1. Load-bearing wall |
| _____b. Wall that supports only its own weight | 2. Brick bond |
| _____c. Masonry in which the cavity is filled with grout | 3. Scaffold |
| _____d. Length of wood marked for course levels and/or heights and openings | 4. Lead |
| _____e. Pattern in which bricks are laid | 5. Dry bond |
| _____f. Construction crayon | 6. Rack |
| _____g. Section of wall built up and racked back on successive courses | 7. Parging |
| _____h. Wall that not only supports itself but the structure above | 8. Through-wall bonding |
| _____i. Continuous section of masonry one unit in thickness | 9. Grout |
| _____j. Method of determining brick bond by laying brick without mortar | 10. Story pole |
| _____k. Horizontal member placed over wall openings to support the weight of masonry above | 11. Scaffold-high |
| _____l. Thin mixture of mortar; poured into wall cavity for bonding purposes | 12. Non-load-bearing wall |
| _____m. Temporary structure or platform to support workers and material during construction | 13. Wythe |
| _____n. Method of bonding by joining outer and inner walls | 14. Reinforced masonry |
| | 15. Keel |
| | 16. Lintel |
| | 17. Grouted masonry |
| | 18. Strike |
| | 19. Cavity |



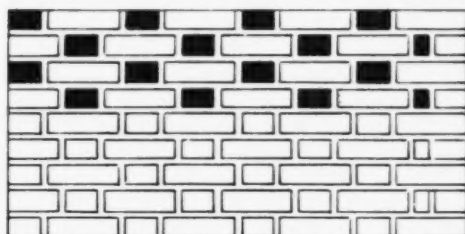
TEST

- ____o. Unit of masonry in which reinforcement is embedded to give additional strength to wall
 - ____p. Air space or opening between two wythes of masonry units
 - ____q. High enough to use a scaffold to continue construction
 - ____r. To tool joints
 - ____s. To set back the end of each course from the end of preceding course
2. State two purposes of wall layout.
- a. _____
 - b. _____
3. Arrange in order the procedures for laying out a wall. Write a "1" in the blank before the first procedure, a "2" before the second procedure, and so on.
- ____a. Measure from point A (starting point) to end of wall; square a mark at this point
 - ____b. Establish opposite side of wall by marking points on a line parallel to chalk line by a distance of proposed wall thickness
 - ____c. Snap a chalk line between these two new points
 - ____d. Locate reference points (A and B) for wall line
 - ____e. Snap a chalk line from point A to point B
 - ____f. Use framing square to square from point A across to second line
4. Name methods of layout.
- a. _____
 - b. _____

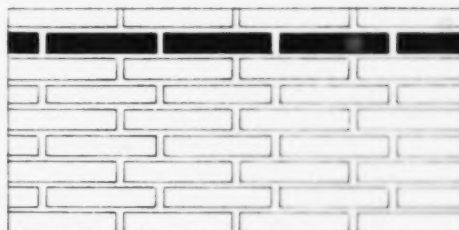
TEST

5. Discuss purposes of bonds.

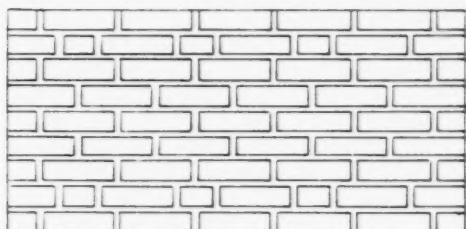
6. Label types of wall bonds. Write the correct names in the blanks.



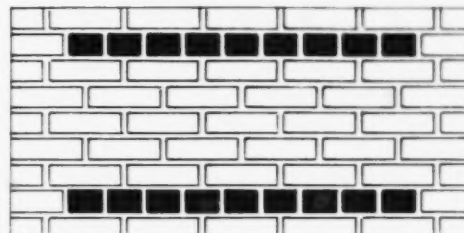
a. _____



b. _____



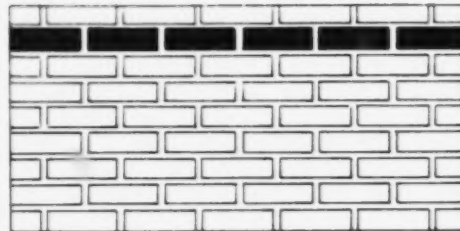
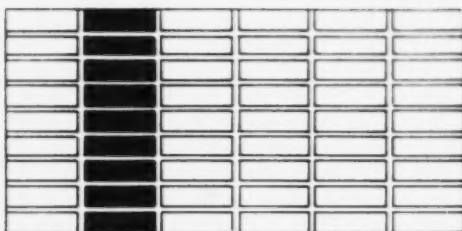
c. _____



d. _____

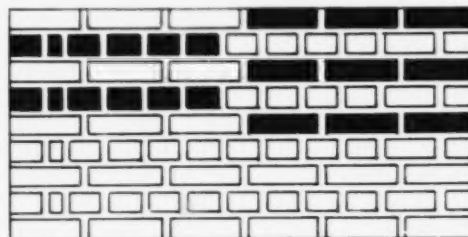
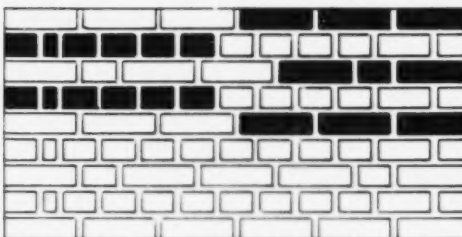


TEST



e. _____

f. _____

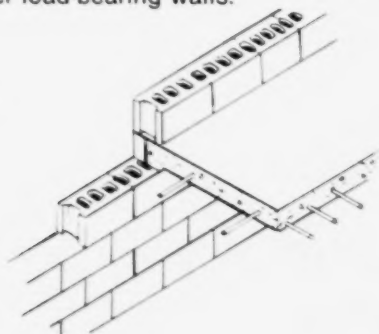


g. _____

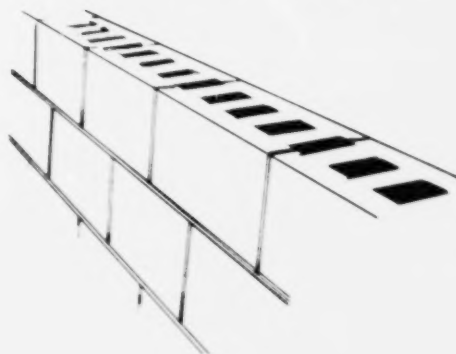
h. _____

TEST

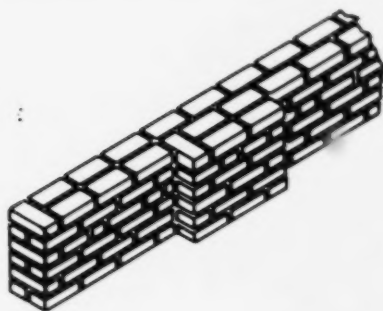
7. Distinguish between load-bearing and non-load-bearing walls. Write an "X" in the blanks under load-bearing walls.



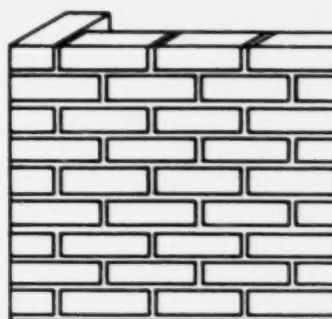
a. _____



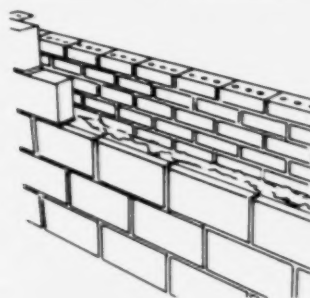
b. _____



c. _____



d. _____

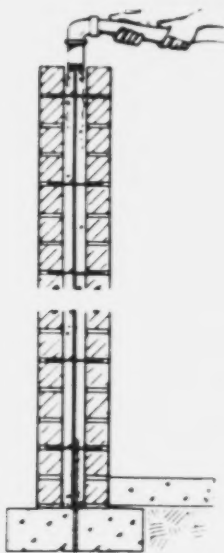


e. _____

TEST

8. State purpose of through-wall bonding. _____

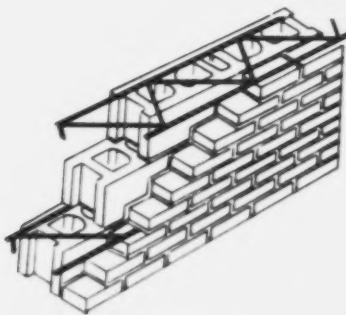
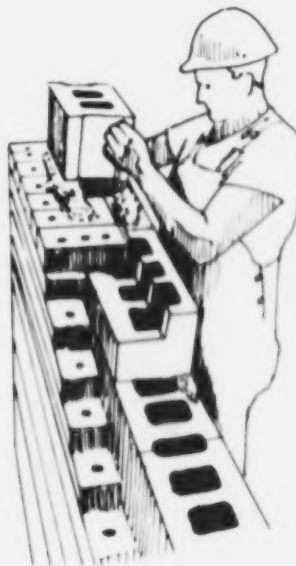
9. Label types of through-wall bonding. Write the correct names in the blanks.



a. _____



b. _____



c. _____

TEST

10. State two purposes of leads.

a. _____

b. _____

11. Name three types of leads.

a. _____

b. _____

c. _____

(NOTE: Test item 12 lists the job sheets. They are an important part of this test. If they have not been completed, check with your instructor.)

12. Demonstrate the ability to

a. Use a framing square to lay out an 8-inch wall corner.

b. Use a level.

c. Lay out a section of wall.

d. Lay out a section of wall containing openings.



BRICKLAYING LAYOUT UNIT III

ANSWERS TO TEST

- | | | | |
|---------|-------|-------|-------|
| 1. a. 7 | f. 15 | k. 16 | p. 19 |
| b. 12 | g. 4 | l. 9 | q. 11 |
| c. 17 | h. 1 | m. 3 | r. 18 |
| d. 10 | i. 13 | n. 8 | s. 6 |
| e. 2 | j. 5 | o. 14 | |

2. Answer should include any two of the following.

- a. Establishing wall locations
- b. Establishing bonds
- c. Establishing openings
- d. Establishing elevations

- | | | |
|---------|------|------|
| 3. a. 6 | c. 4 | e. 2 |
| b. 3 | d. 1 | f. 5 |

4. a. Dry bonding
b. Steel tape bonding

5. Discussion should include the following.

- a. Adding strength and rigidity to the wall
- b. Beautifying through design and economy of design

- | | |
|-----------------------------|---------------------------|
| 6. a. Flemish | e. Stack |
| b. One-third running | f. Running |
| c. Common or Flemish header | g. English cross or Dutch |
| d. Common or full header | h. English |

7. a, c, e

8. Joining outer and inner wythes to strengthen wall

9. a. Grouting and reinforcement
b. Header construction
c. Joint reinforcement or heavy-gauge ties



ANSWERS TO TEST

10. Answer should include any two of the following.
 - a. Maintaining proper elevation
 - b. Establishing wall pattern
 - c. Acting as a guide for wall construction

11. Answer should include any three of the following.
 - a. Outside corner
 - b. Angle or inside corner
 - c. Rack back
 - d. Corner pole

12. Performance skills evaluated to the satisfaction of the instructor.

BRICKLAYING BASIC SKILLS
UNIT IV

UNIT OBJECTIVE

After completing this unit, the student should be able to lay block and brick and use a brick trowel to pick up mortar, place mortar, and spread mortar. The student will show this ability by completing the job sheets and unit test with a minimum score of 80 percent.

SPECIFIC OBJECTIVES

After completing this unit, the student should be able to

1. Match terms associated with bricklaying basic skills to their definitions.
2. Describe the correct way to hold a brick trowel.
3. Label methods of picking up mortar from mortarboard.
4. Arrange in order procedures used to pick up mortar.
5. Describe why wrist is snapped when picking up mortar.
6. Explain direction of travel for placing mortar.
7. Arrange in order procedures for placing mortar.
8. Identify direction of travel for laying brick or block.
9. Label types of bedding.
10. State purposes of the frog.
11. Select from a list basic skills used in masonry work.
12. Label methods used to align masonry units.
13. State bricklaying safety rules.
14. Demonstrate the ability to
 - a. Measure, mark, and cut brick and block.
 - b. Spread mortar on a two-by-four.
 - c. Swipe mortar on a two-by-four for block.
 - d. Construct a section of wall.



OBJECTIVE SHEET

- e. Construct a section of wall with openings.
- f. Lay block to established leads.
- g. Build a 90-degree block lead.
- h. Lay brick to established leads.
- i. Build a 90-degree brick lead.

BRICKLAYING BASIC SKILLS
UNIT IV

SUGGESTED ACTIVITIES

I. Unit contents

- A. Objective sheet
- B. Suggested activities
- C. Information sheet
- D. Job sheets
 - 1. Job Sheet #1 — Measure, Mark, and Cut Brick and Block
 - 2. Job Sheet #2 — Spread Mortar on a Two-by-Four
 - 3. Job Sheet #3 — Swipe Mortar on a Two-by-Four for Block
 - 4. Job Sheet #4 — Construct a Section of Wall
 - 5. Job Sheet #5 — Construct a Section of Wall with Openings
 - 6. Job Sheet #6 — Lay Block to Established Leads
 - 7. Job Sheet #7 — Build a 90-Degree Block Lead
 - 8. Job Sheet #8 — Lay Brick to Established Leads
 - 9. Job Sheet #9 — Build a 90-Degree Brick Lead
- E. Test
- F. Answers to test

II. Instructor's guide

- A. Review unit and plan presentation.
- B. Obtain tools and materials necessary to perform procedures outlined in job sheets.
- C. Introduce unit to students.
 - Discuss procedures for using and bonding mortar.
 - Discuss basic skills used in masonry work.
 - Discuss and emphasize the importance of observing proper safety precautions pertaining to masonry work.



SUGGESTED ACTIVITIES

- D. Provide students with information and job sheets.
- E. Discuss information and job sheets.
1. Use Information Sheet, Section I, to discuss terms and definitions associated with bricklaying basic skills.
 - Point out the importance of defining terms for common understanding and for better understanding of this unit.
 2. Use Information Sheet, Section II, to discuss the correct way to hold a brick trowel.
 - Demonstrate the correct way to hold the trowel, then have each student demonstrate the correct way.
 3. Use Information Sheet, Sections III through V, to discuss methods and procedures for picking up mortar.
 - Give demonstration then have each student demonstrate.
 4. Use Information Sheet, Sections VI through VIII, to discuss direction of travel and procedures for placing mortar and direction of travel for laying masonry units.
 - Explain how awkward it is to place mortar if direction of travel and procedures are not properly followed.
 - Demonstrate proper methods, then have students practice and demonstrate; if students do not do it properly, correct them, then have them practice some more.
 5. Use Information Sheet, Section IX, to discuss types of bedding.
 - Show students illustrations of various types of bedding.
 - Discuss reasons for different types of bedding.
 - Demonstrate the different types of bedding for block and brick.
 - Have students practice applying bedding, then have each of them demonstrate how to do it.
 6. Use Information Sheet, Section X, to discuss and explain what a frog is and its purpose.
 7. Use Information Sheet, Sections XI and XII, to discuss basic skills used in masonry work.

SUGGESTED ACTIVITIES

- Demonstrate the procedures in the job sheets pertaining to each of these skills.
 - Discuss and demonstrate each of the basic skills, then have students demonstrate them.
 - Discuss and demonstrate methods used to align masonry units.
 - Have students demonstrate the different methods used to align units.
8. Use Information Sheet, Section XIII, to discuss bricklaying safety rules.
- Have students review safety rules in this unit, then review the safety rules pertaining to bricklayers in the "Safety and First Aid" unit in *Fundamentals of Construction*.
- F. Give test.
- G. Critique test and discuss in class.
- H. Reteach and retest as necessary.
- I. Complete appropriate sections of competency profiles.

(NOTE: A master of the competency profile for this book is provided at the front of the instructor edition. You may duplicate the profile and distribute it to students as needed.)

- III. Unit reference — Hendrix, Laborn J. "Bud". *Bricklaying Curriculum—Principles of Bricklaying*. Stillwater, Oklahoma: State Department of Vocational and Technical Education/Curriculum and Instructional Materials Center, and The Associated General Contractors of America, 1984.



BRICKLAYING BASIC SKILLS
UNIT IV

INFORMATION SHEET

I. Terms and definitions

- A. **Bed joint** — Horizontal mortar joint between two units
- B. **Block or brick leads** — Sections of wall built up and racked back on successive courses; used to attach line as guide for constructing wall between them
- C. **Closure** — Last unit laid in a course
- D. **Consistency** — Relative mobility, or ability of fresh mortar to flow
- E. **Deadman** — Object to which the line is attached for lead or first course
(NOTE: A deadman could be a pole, brace, or even another block.)
- F. **Ferrule** — Metal cap around handle of brick trowel at shank end
- G. **Frog** — Depression, such as a groove or recess, in one or both of the larger sides of a brick or block; provides key for mortar at joints
- H. **Furrow** — Slight indentation made in bed joint mortar
- I. **Laboratory mortar** — Mixture of lime, sand, and water
- J. **Level** — To cause to conform to a specified grade; perfect horizontal plane
- K. **Mortar body** — Consistency or density of mortar that is plastic and workable
- L. **Head joint** — Vertical mortar joint between two units
- M. **Plumb** — Perfect vertical plane
- N. **Racking back** — Method of stepping back successive courses
- O. **Spreading mortar** — Process of placing mortar for the course to be laid
- P. **Temper** — To remix mortar to proper consistency

II. Correct way to hold a brick trowel (See Figure 1)

- A. Place fingers at bottom of handle
- B. Place thumb on top of ferrule, pointing toward point of blade
- C. Hold handle firmly, but with a relaxed grip



INFORMATION SHEET

D. Apply pressure between thumb and forefinger

EXAMPLE:

FIGURE 1



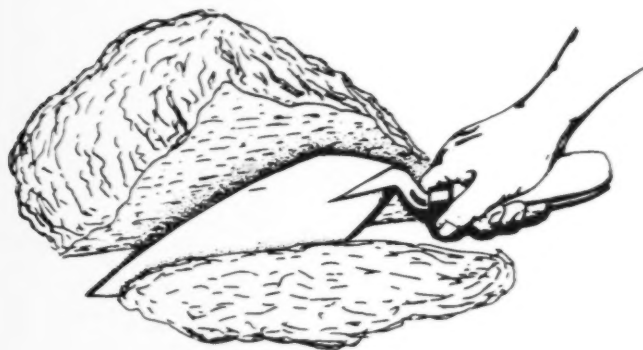
III. Methods of picking up mortar from mortarboard (Figures 2 and 3)

A. Cupping method (from the side of mortarboard)

(NOTE: This method is the most widely used.)

EXAMPLE:

FIGURE 2



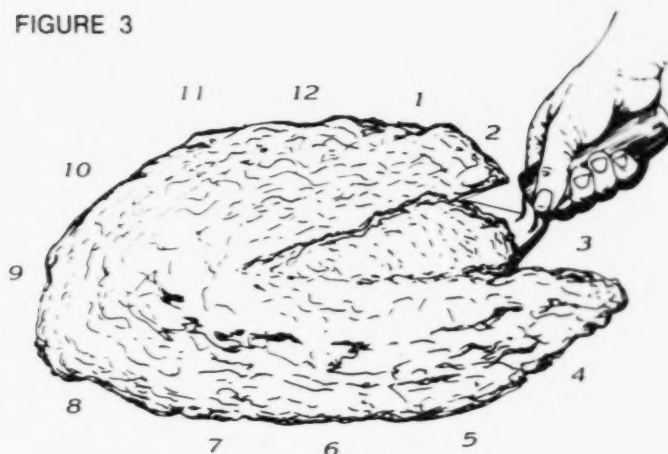
B. Clock method (from the middle of mortarboard)

(NOTE: There are several ways of using the trowel to cut mortar from the mortar pile, but the cupping and clock methods are the most common.)

INFORMATION SHEET

EXAMPLE:

FIGURE 3



IV. Procedures used to pick up mortar (Figures 4-6)

- A. Use a downward slicing motion of trowel to separate a portion of mortar from main pile
- B. Use a rolling motion to move the mortar to edge of mortarboard

EXAMPLE:

FIGURE 4



INFORMATION SHEET

C. Use trowel to work mortar into a long, tapered shape

(NOTE: This is a convenient shape to pick up.)

EXAMPLE:

FIGURE 5



D. Hold trowel flat against mortarboard, and slide it forward under the small pile of mortar

EXAMPLE:

FIGURE 6



INFORMATION SHEET

- E. While pushing forward, lift mortar with an upward motion of trowel

(NOTE: With this motion, the trowel lifts the mortar free of the mortarboard.)

- V. Why wrist is snapped when picking up mortar — To set mortar on the trowel to keep it from falling off

(NOTE: Snapping the wrist is one of the most important and difficult steps to master when picking up mortar for applying to block.)

- VI. Direction of travel for placing mortar

- A. Right-handed person

1. Spreads left to right
2. Moves backwards

- B. Left-handed person

1. Spreads right to left
2. Moves backwards

- VII. Procedures for placing mortar

- A. Load trowel

- B. Keep elbow slightly away from body

(NOTE: When elbow is held slightly away from body, movement of the trowel hand is not restricted.)

- C. Use a sweeping motion to spread mortar

- D. Fill any spaces in bed joint with excess mortar



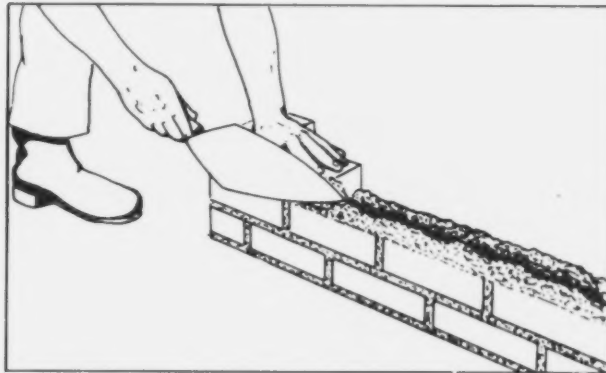
INFORMATION SHEET

VIII. Direction of travel for laying brick or block

A. Laying to hand (Figure 7)

(NOTE: Bricklayer walks forward.)

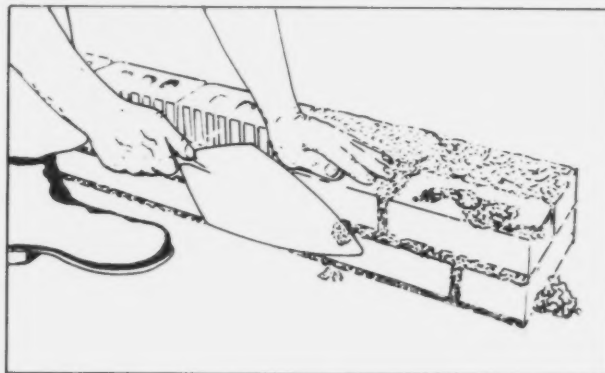
FIGURE 7



B. Laying backhand or against hand (Figure 8)

(NOTE: Bricklayer walks backward.)

FIGURE 8

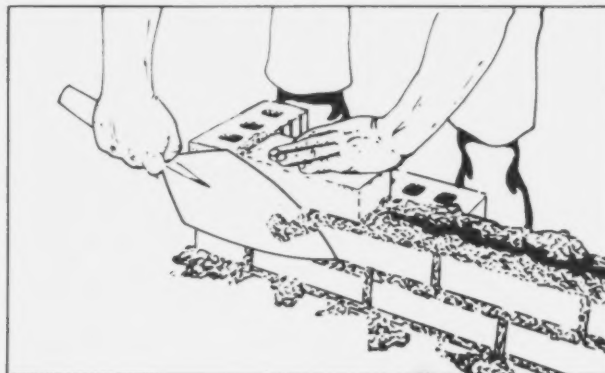


INFORMATION SHEET

C. Laying overhand (Figure 9)

(NOTE: This method is used when laying units on the outside working from the inside. The bricklayer also lays to or against hand when laying brick overhand.)

FIGURE 9

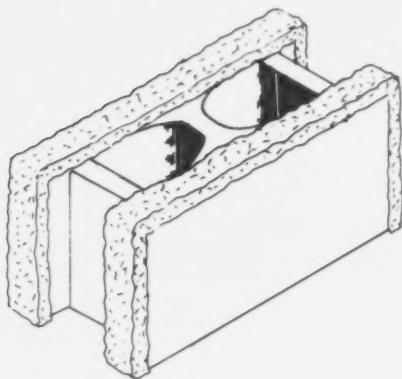


IX. Types of bedding (Figures 10-13)

A. Block

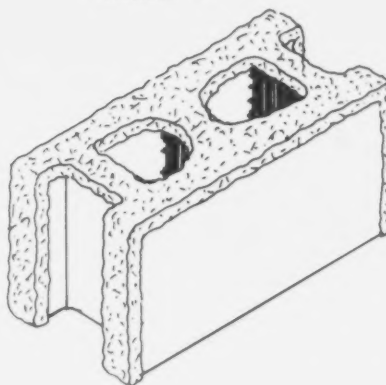
1. Face shell

FIGURE 10



2. Full Mortar

FIGURE 11

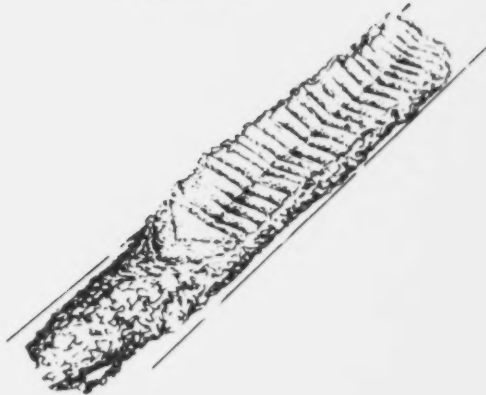


INFORMATION SHEET

B. Brick

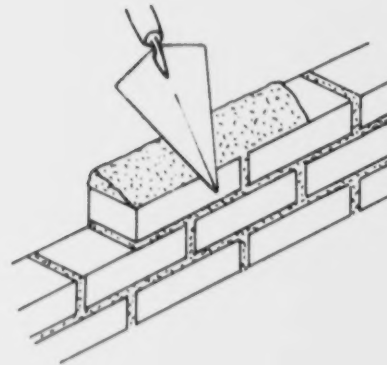
1. Furrowed

FIGURE 12



2. Tapered or beveled

FIGURE 13



X. Purposes of the frog

- A. Locks mortar into recess for better grip
- B. Creates special effects when bricks are laid on their sides
- C. Saves cost of materials

(NOTE: Some bricks have holes in the bottom, which also tend to provide a better bond. These are called coved bricks.)

XI. Basic skills used in masonry work

- A. Spreading mortar with brick trowel
- B. Applying head joints to masonry
- C. Leveling masonry courses
- D. Plumbing masonry units
- E. Checking course height with a modular rule
- F. Checking alignment
- G. Striking mortar joints
- H. Brushing wall and striking joints

INFORMATION SHEET

- I. Cutting masonry units with hammer and brick set
- J. Cutting masonry units with masonry saw
- XII. Methods used to align masonry units (Figures 14-18)

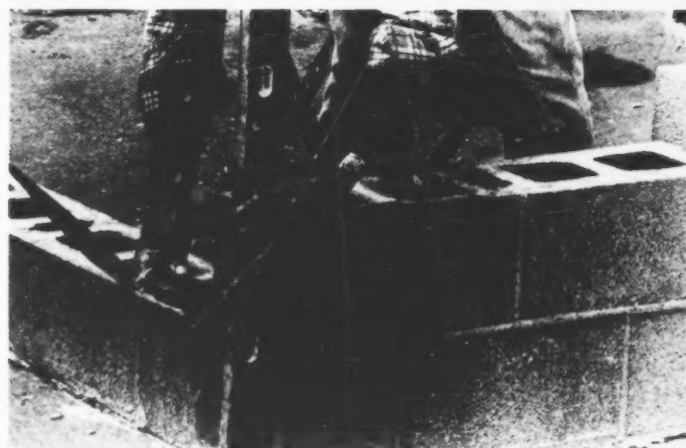
A. Leveling

FIGURE 14



B. Plumbing

FIGURE 15



INFORMATION SHEET

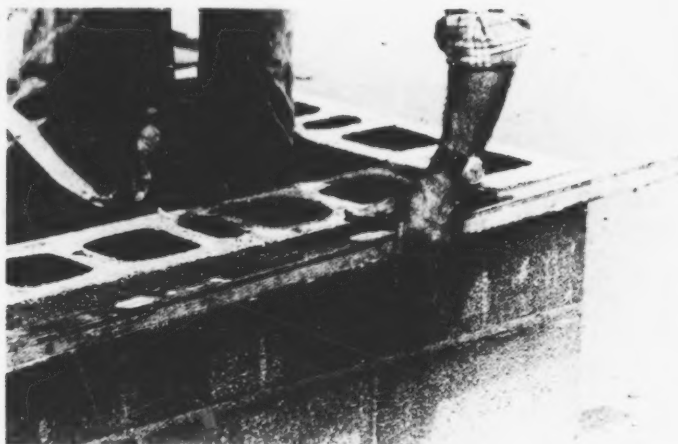
C. Racking or tailing a lead

FIGURE 16



D. Checking alignment (in-line)

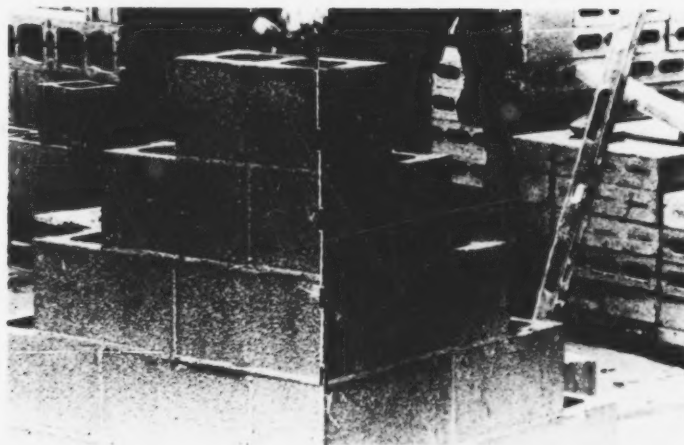
FIGURE 17



INFORMATION SHEET

E. Checking course height

FIGURE 18



XIII. Bricklaying safety rules

- A. Always cut masonry away from other workers
- B. Wear proper protective clothing and safety equipment when using masonry saw
- C. Always replace mortar carefully on mortarboard or in tub; *never* throw it so that it will splash
- D. Keep tools out of path of other people
- E. Always hand tools or materials to other person; *never* throw them
- F. Use proper tool for job, and practice good tool habits as skills are learned
- G. Lift heavy objects properly
- H. Follow OSHA regulations



BRICKLAYING BASIC SKILLS
UNIT IV

JOB SHEET #1 — MEASURE, MARK, AND CUT BRICK AND BLOCK

I. Equipment and materials

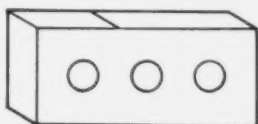
- A. Brick hammer
- B. Brick set
- C. Rule or tape
- D. Crayon or pencil
- E. Brick
- F. Block
- G. Safety goggles
- H. Combination square

(NOTE: Be sure to put on safety goggles before starting procedures.)

II. Procedure for cutting brick

- A. Mark face of brick where it is to be cut (Figure 19)

FIGURE 19



- B. Place brick on smooth, cushioned surface with marked face up

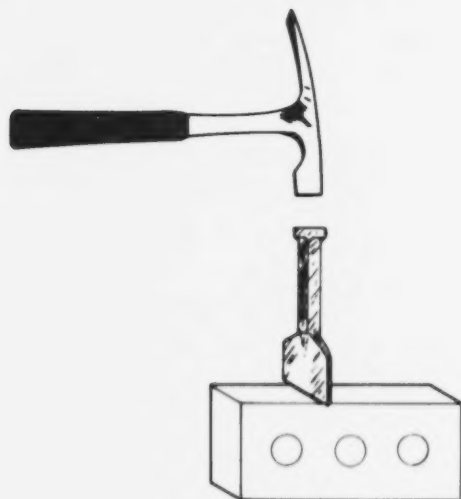
(NOTE: Never place brick on a hard surface for cutting.)



JOB SHEET #1

- C. Place brick set on mark on brick; hold vertically with flat side of blade facing direction of finished cut (Figure 20)

FIGURE 20



- D. With brick hammer, strike brick set a light blow, just enough to score brick
- E. Turn brick to opposite side and repeat procedure
- F. Continue turning and scoring until brick is scored on all four sides
- (NOTE: Some bricks do not have to be scored on all four sides.)
- G. Turn brick so that face is up
- H. Place brick set vertically on scored mark; strike brick set sharply with hammer
- (NOTE: The brick should break cleanly along the scored line.)

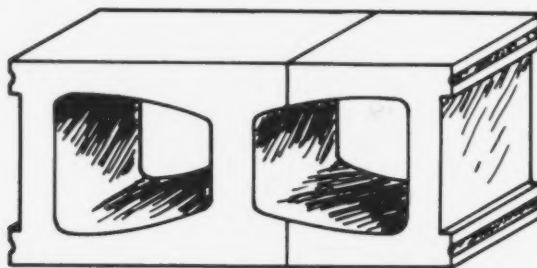
III. Procedure for cutting block

- A. Mark face of block where it is to be cut

JOB SHEET #1

- B. Use square to transfer mark to other three sides of the block (Figure 21)

FIGURE 21

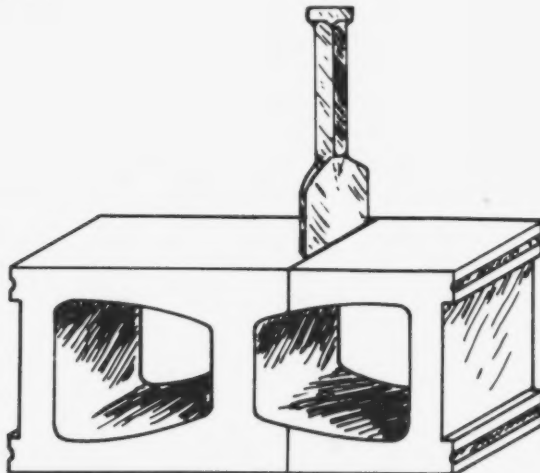


- C. Place block on smooth, cushioned surface with face up

(NOTE: Never place block on a hard surface for cutting.)

- D. Place brick set vertically on mark on block, with flat side of blade facing direction of finished cut (Figure 22)

FIGURE 22



JOB SHEET #1

- E. With brick hammer, strike brick set a light blow, just enough to score block
(NOTE: Do not strike brick set too hard before scoring all four sides of the block.)
- F. Turn block completely over; use same procedure to score this side
- G. Score sides of block using same procedure
- H. Turn block again so that face is up
- I. Position brick set on scored mark; hold chisel firmly, and strike brick set sharply with hammer
(NOTE: Block should break cleanly along scored line.)
- J. Have instructor inspect your work
- K. Clean work area; clean and put away all tools and equipment

BRICKLAYING BASIC SKILLS
UNIT IV

JOB SHEET #2 — SPREAD MORTAR ON A TWO-BY-FOUR

I. Equipment and materials

- A. Brick trowel
- B. Mortarboard and stand
- C. Laboratory mortar
- D. Bucket of water
- E. Shovel
- F. Two-by-four

II. Procedure

(NOTE: When laying units, keep walls as clean as possible to be more economical and to make cleanup easier.)

- A. Position mortarboard on stand
- B. Wet mortarboard
- C. Place mortar in center of board (Figure 23)

FIGURE 23



JOB SHEET #2

D. Place two-by-four approximately 2 feet from mortarboard (Figure 24)

FIGURE 24



E. Pick up trowel; hold trowel firmly but with a relaxed grip (Figure 25)

FIGURE 25



JOB SHEET #2

- F. Move trowel in hand until it feels comfortable and proper grip and movement are obtained
- G. Cut out a trowel of mortar from side of mortarboard (Figure 26)
- (NOTE: Repeat steps E through G until you have the feel of the trowel containing mortar.)

FIGURE 26



- H. Pick up a trowel of mortar, and spread about 16 inches of mortar on two-by-four (Figure 27)

FIGURE 27



JOB SHEET #2

- I. Continue picking up mortar and spreading it on two-by-four until two-by-four is covered (Figure 28)

(NOTE: Avoid waste and keep the mortar thickness constant.)

FIGURE 28



- J. Spread a solid bed joint with little or no furrowing
- K. When bed joint is spread satisfactorily, have instructor evaluate
- L. Remove mortar and place on mortarboard
- M. Temper mortar if needed to keep same consistency
- N. Clean trowel
- O. Repeat procedure
- P. Have instructor inspect your work
- Q. Clean work area; clean and put away all tools and equipment

BRICKLAYING BASIC SKILLS
UNIT IV

JOB SHEET #3 — SWIPE MORTAR ON A TWO-BY-FOUR FOR BLOCK

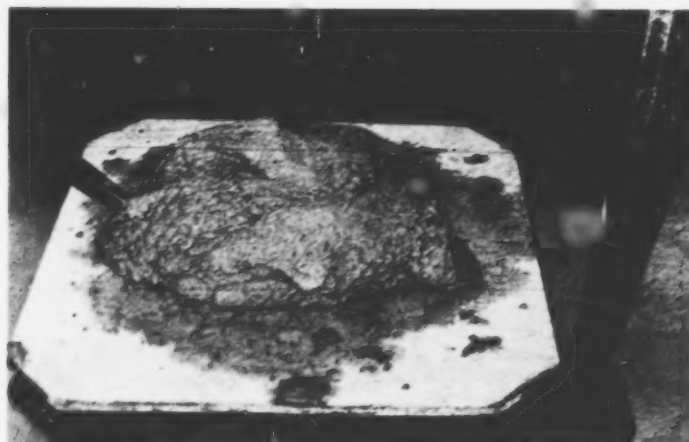
I. Equipment and materials

- A. Brick trowel
- B. Mortarboard and stand
- C. Laboratory mortar
- D. Bucket of water
- E. Two-by-four
- F. Shovel

II. Procedure

- A. Position mortarboard on stand
- B. Wet mortarboard
- C. Place mortar in center of board (Figure 29)

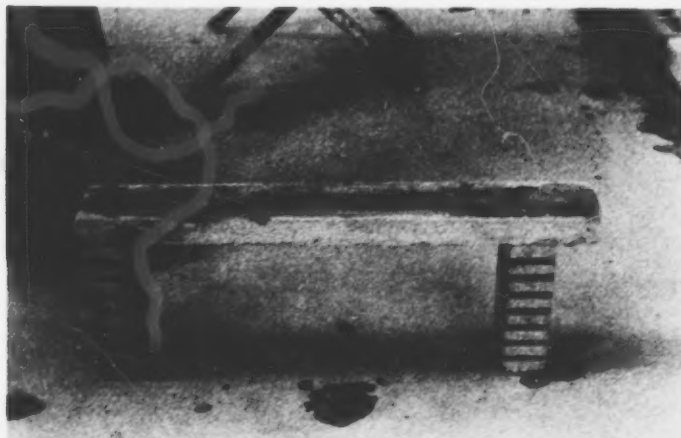
FIGURE 29



JOB SHEET #3

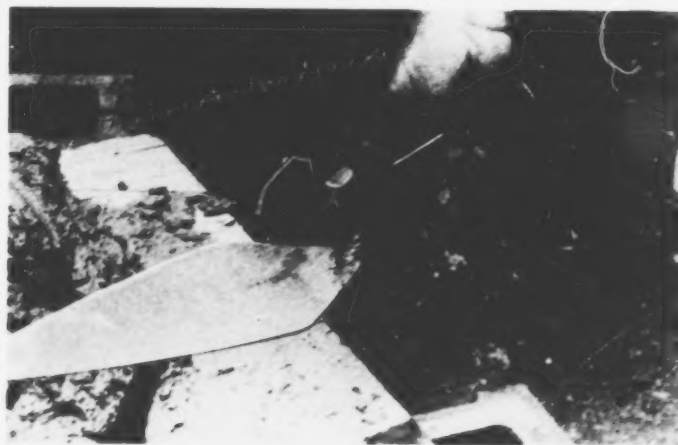
D. Place two-by-four approximately 2 feet from mortarboard (Figure 30)

FIGURE 30



E. Pick up trowel; hold trowel firmly but with a relaxed grip (Figure 31)

FIGURE 31



JOB SHEET #3

- F. Move trowel in hand until it feels comfortable and proper grip and movement are obtained
- G. Cut out a trowel of mortar from side of mortarboard (Figure 32)

(NOTE: Repeat steps E through G until you have the feel of the trowel containing mortar.)

FIGURE 32



- H. Take a trowel full of mortar from board, shaking trowel with a quick vertical snap of the wrist to make mortar stick to trowel (Figure 33)

FIGURE 33



JOB SHEET #3

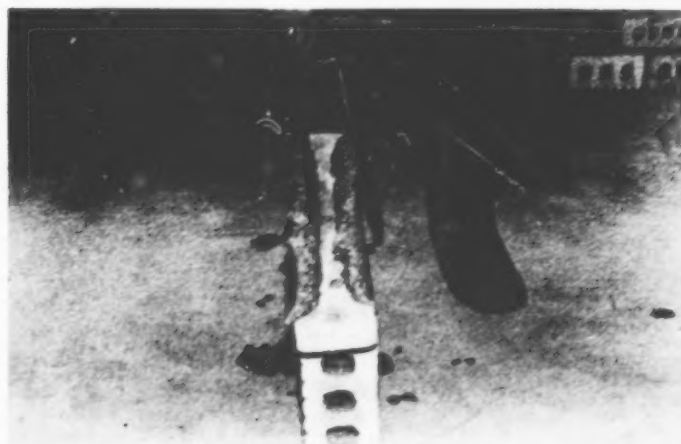
- I. Swipe mortar on two-by-four for face shell bedding, leaving only enough mortar for 1-inch thickness (Figure 34)

FIGURE 34



(NOTE: Swipe mortar on outside edges of two-by-four. See Figure 35.)

FIGURE 35



JOB SHEET #3

- J. Swipe a solid bed of mortar 1 inch thick, making a minimum number of trips to mortarboard

(NOTE: In some areas, specifications call for full bedding.)

- K. When bed joint has been spread satisfactorily, have instructor evaluate
- L. Remove mortar and place on mortarboard
- M. Temper mortar if needed to keep the same consistency
- N. Clean trowel
- O. Repeat procedure
- P. Have instructor inspect your work
- Q. Clean work area; clean and put away all tools and equipment



BRICKLAYING BASIC SKILLS
UNIT IV

JOB SHEET #4 — CONSTRUCT A SECTION OF WALL

- I. Equipment and materials
 - A. Steel tape, 100-foot
 - B. Bricklayer's modular rule
 - C. Trowel
 - D. Story pole
 - E. Brick hammer
 - F. Concave jointer
 - G. 4-foot level
 - H. Dusting brush
 - I. Mason's line
 - J. Line pins and blocks
 - K. 5-gallon water pail and water
 - L. 150 face brick
 - M. 23 square-end concrete blocks, 8" x 8" x 16"
 - N. 4 square-end concrete half blocks, 8" x 8" x 8"
 - O. Laboratory mortar
 - P. Specifications furnished by instructor



JOB SHEET #4

II. Procedure

(NOTE: Construct wall section, using the plan below and the procedure outlined on the following pages. See Figures 36 and 37.)

FIGURE 36

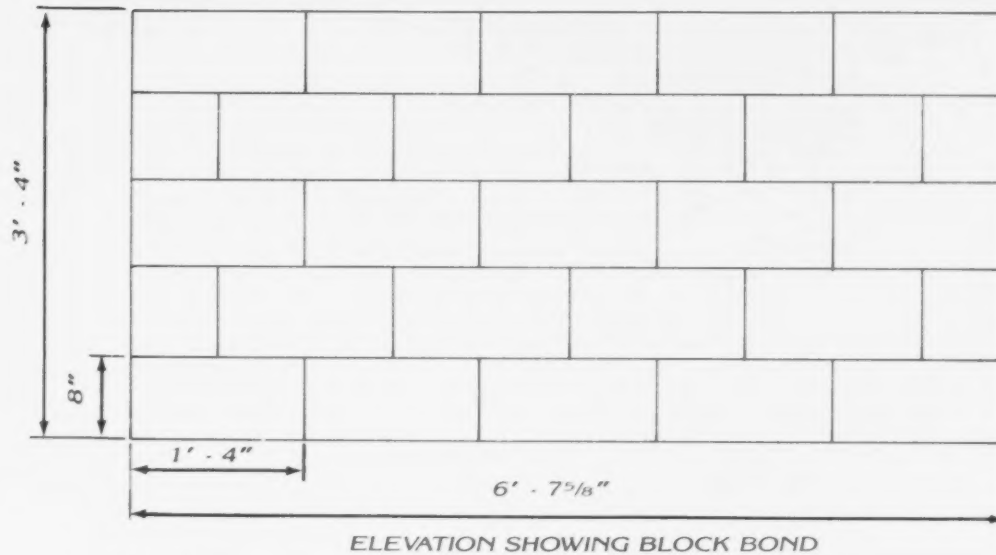
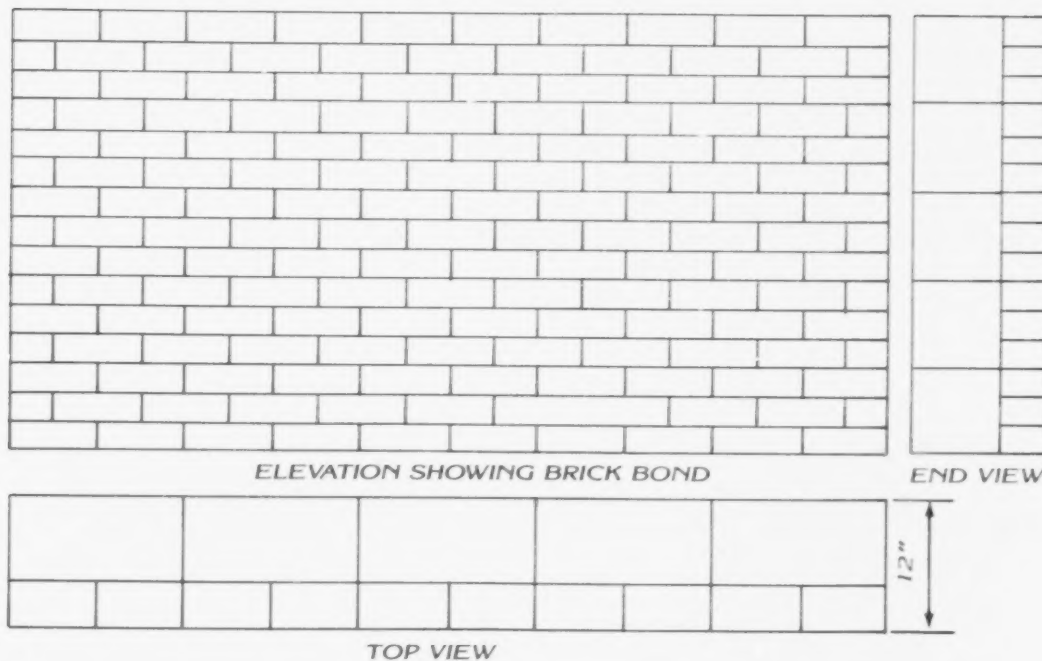


FIGURE 37

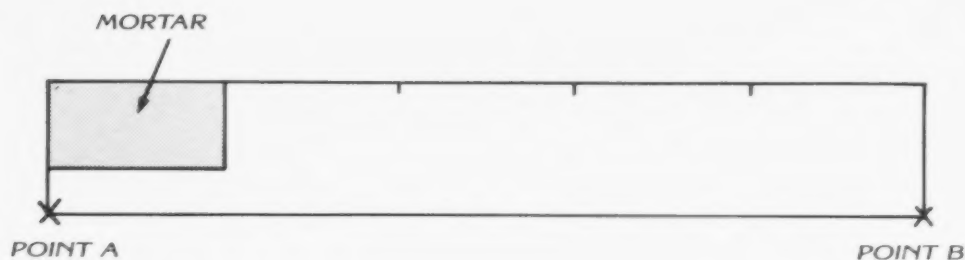


JOB SHEET #4

A. Lay first block

1. Spread bed mortar for first block at point A end of wall (Figure 38)

FIGURE 38



2. Pick up block and gently position it, keeping block straight with interior wall line and end line
3. Spread mortar and set second block at point B end of wall
4. Check course height with story pole

B. Lay first course of block to the mason's line

(NOTE: The first course of the wall is very critical. The blocks should be in proper alignment with wall line, plumb, level, and square.)

C. Lay second course of block to mason's line

D. Check course of block to mason's line

E. Remove mason's line

F. Parge exterior face of concrete block

(NOTE: The exterior face is the face next to the brick.)

1. Starting at the bottom, apply a coat of mortar to face of block
2. Pick up mortar, apply to wall, and then spread with back of trowel

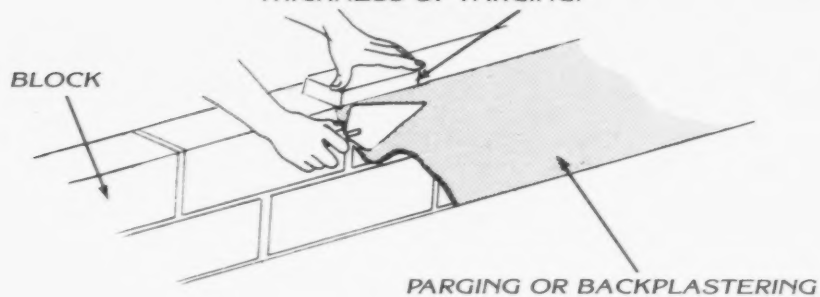
(NOTE: Hold brick on top of block, using brick as a guide to get specified thickness of mortar. See Figure 39.)



JOB SHEET #4

FIGURE 39

PLACE BRICK ON TOP OF LAST COURSE OF
FACE WYTHER FOR GAUGE TO GET SPECIFIED
THICKNESS OF PARGING.



3. Remove any mortar dropped on floor during parging

G. Lay out a dry bond for first course of brick

H. Mark floor at end of each brick

I. Remove dry bond

J. Lay first course of brick

(NOTE: Check height of each course with story pole.)

K. Build leads for five more courses of brick

L. Lay the five courses of brick to the mason's line

(NOTE: Make sure that the height of the sixth course of brick is the same as the second course of block.)

M. Strike vertical and horizontal (head and bed) joints

N. Brush wall after striking to remove mortar burrs

O. Restrike joints to first-class finish

P. Place mortar for leads

Q. Build a two-course lead on one end; then build a two-course lead on other end

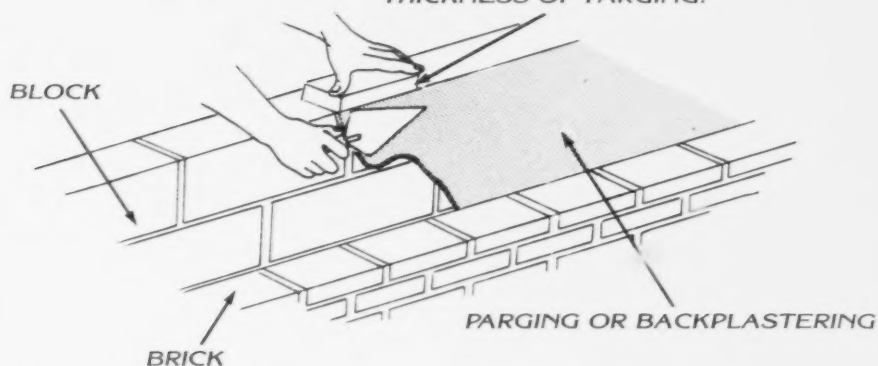
R. Lay block to line for two courses

S. Parge face of the two courses of block (See Figure 40)

JOB SHEET #4

FIGURE 40

PLACE BRICK ON TOP OF LAST COURSE OF
FACE WYTHE FOR GAUGE TO GET SPECIFIED
THICKNESS OF PARGING.



- T. Build six-course leads of brick at points A and B
- U. Lay six courses of brick to mason's line
- V. Strike if necessary
- W. Cut and place reinforcement on mortar, pressing into mortar for proper bond
- X. Place mortar for last course of block
- Y. Lay last course of block
- Z. Parge face of block
- AA. Lay last three courses of brick
- BB. Strike all head and bed joints
- CC. Brush wall after striking to remove mortar burrs
- DD. Restrike joints to first-class finish
- EE. Have instructor evaluate wall section
- FF. Clean work area; clean and put away all tools and equipment



BRICKLAYING BASIC SKILLS
UNIT IV

JOB SHEET #5 — CONSTRUCT A SECTION OF WALL WITH OPENINGS

I. Equipment and materials

- A. Steel tape, 100-foot
- B. Bricklayer's modular rule
- C. Trowel
- D. Story pole
- E. Brick hammer
- F. Concave jointer
- G. 4-foot level
- H. Dusting brush
- I. Mason's line
- J. Line pins and blocks
- K. 5-gallon water pail and water
- L. 150 face brick
- M. 20 square-end concrete blocks, 8" x 8" x 16"
- N. 10 square-end concrete half blocks, 8" x 8" x 8"
- O. Laboratory mortar
- P. Specifications furnished by instructor
- Q. 3 steel lintels, 3'-4" x 3 1/2" x 3 1/2" x 3/8"
- R. 3 steel lintels, 2'-0" x 3 1/2" x 5 1/2" x 3/8"
- S. Goggles
- T. Dust respirator

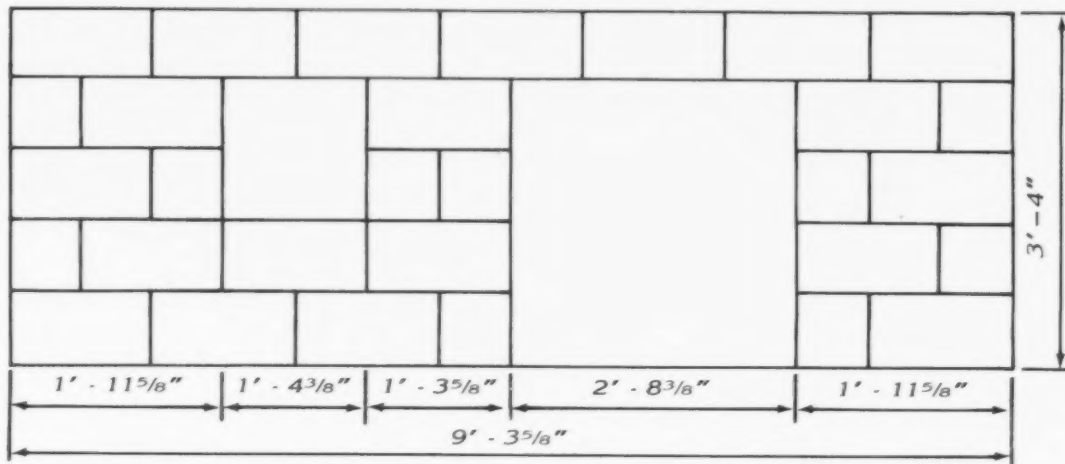


JOB SHEET #5

II. Procedure

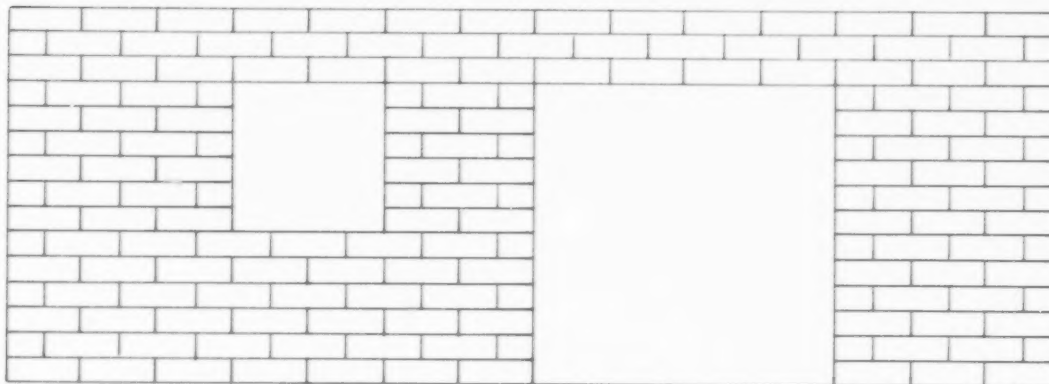
(NOTE: Construct the wall section, using the plan below and the procedure outlined on the following pages. See Figures 41 and 42.)

FIGURE 41



ELEVATION SHOWING BLOCK BOND WITH DOOR AND WINDOW OPENINGS

FIGURE 42



ELEVATION SHOWING BRICK BOND WITH DOOR AND WINDOW OPENINGS

JOB SHEET #5

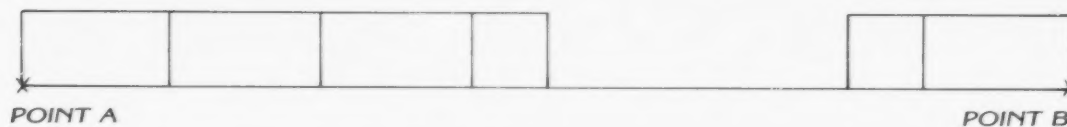
- A. Lay first course of blocks to mason's line**

(NOTE: Check each course height with story pole. It is very critical that the blocks in the first course are plumb, level, square, and in proper alignment with wall lines.)

- B. Check door opening for accurate dimensions (Figure 43)**

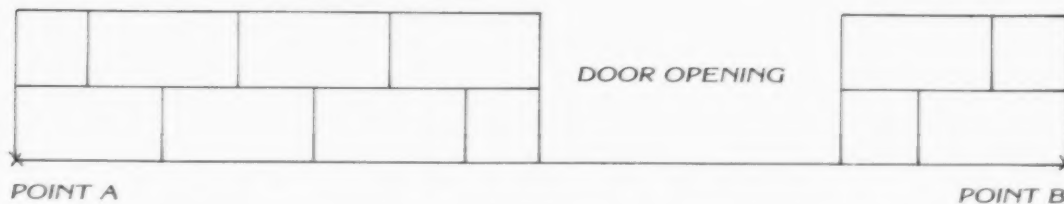
(NOTE: Instructor may have students build a rough door frame to keep door opening accurate.)

FIGURE 43



- C. Remove mason's line
- D. Lay corner blocks of second course
- E. Lay remainder of second course of blocks to the line (Figure 44)

FIGURE 44

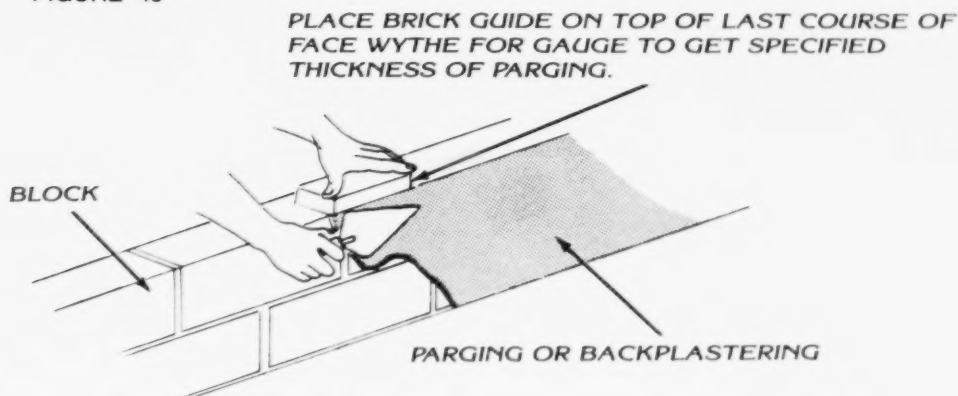


JOB SHEET #5

F. Parge exterior face of concrete blocks

1. Starting at bottom, apply a coat of mortar to face of block (Figure 45)
2. Pick up mortar, apply to wall, and then spread with back of trowel

FIGURE 45

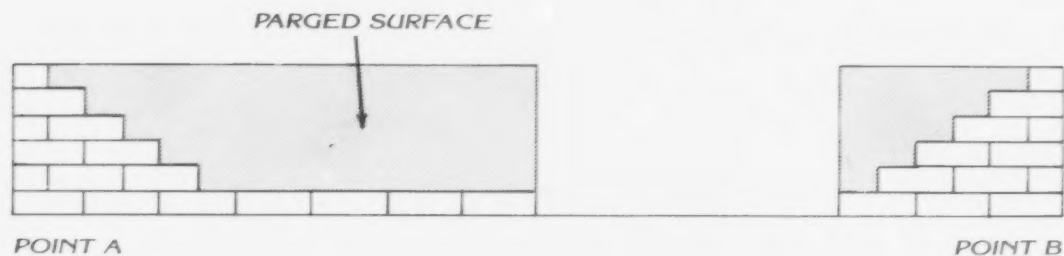


3. Remove any mortar dropped on floor during parging
- G. Lay out dry bond for first course of brick
- H. Mark floor at ends of each brick
- I. Remove dry bond
- J. Lay first course of brick to mason's line
- K. Check door opening for accurate dimensions

JOB SHEET #5

L. Build a five-course lead at both point A and point B (Figure 46)

FIGURE 46



M. Lay five courses of brick to mason's line

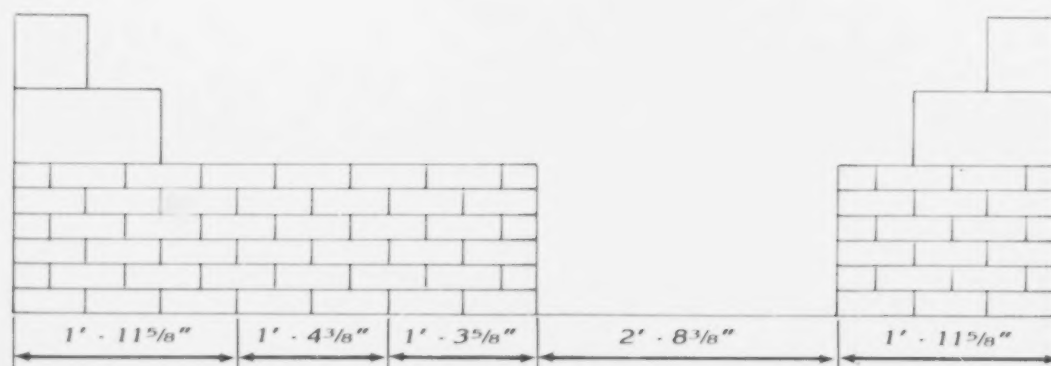
(NOTE: Constantly check door opening height. Also check to see if sixth course of brick is same as second course height of block.)

N. Strike head and bed joints if necessary

O. Lay two-course block lead at both point A and point B

1. Use steel tape to mark out window opening shown on shop plan
2. Square window opening from marks that were taped to interior wall line (Figure 47)

FIGURE 47



JOB SHEET #5

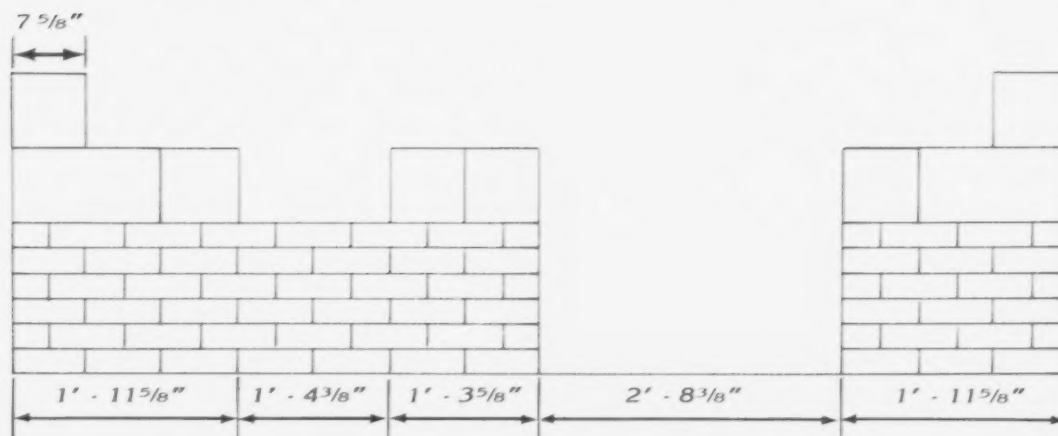
P. Use masonry saw to dry cut half block to measure $7 \frac{5}{8}$ inches at its length

(NOTE: This should be done before placing mortar for half blocks. The half block is cut because the full block on next course measures $15 \frac{5}{8}$ inches.)

Q. Lay two courses of block to the line

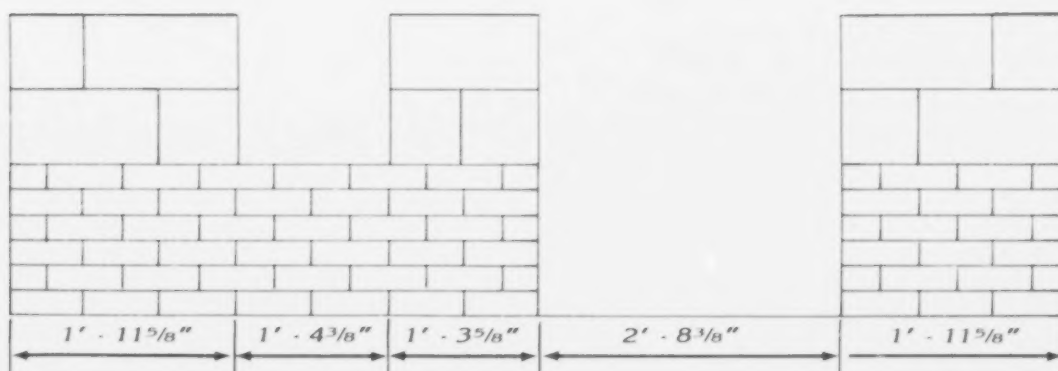
R. Check window opening for accurate dimensions (Figure 48)

FIGURE 48



S. Plumb window and door openings, making sure that they are perfectly plumb and level at tops of openings (Figure 49)

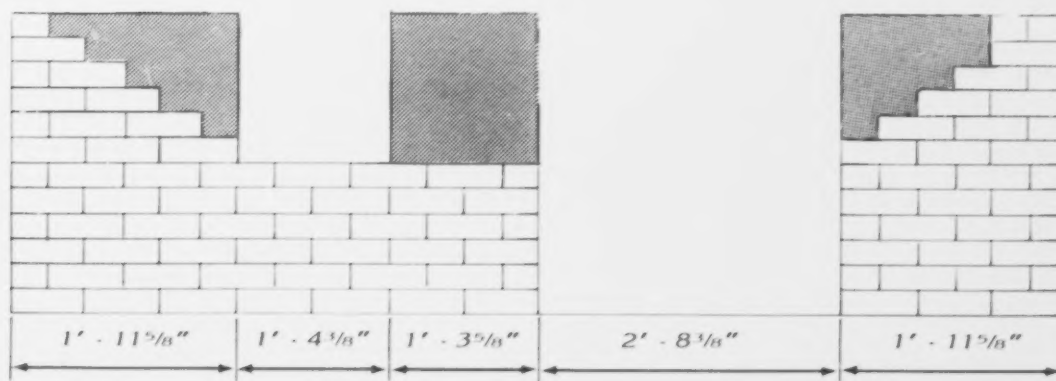
FIGURE 49



JOB SHEET #5

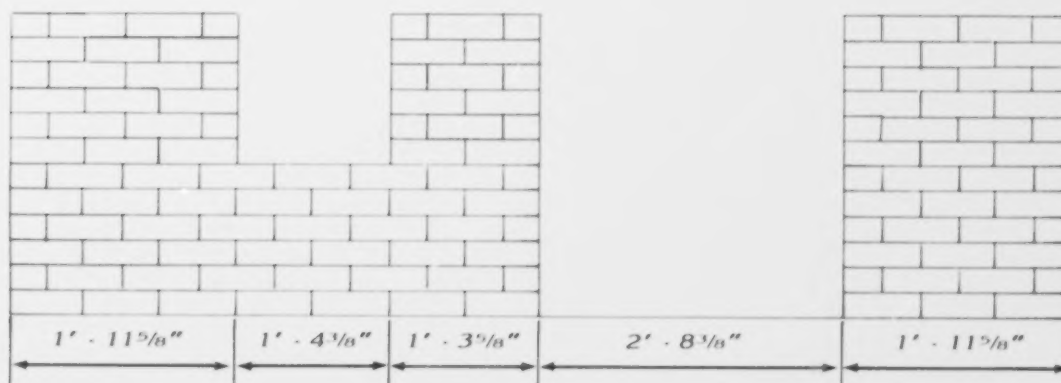
- T. Check stiffness of mortar joints and strike, if necessary, using concave jointer
- U. Brush wall to remove mortar burrs
- V. Temper mortar if necessary to a good, workable mortar
- W. Parge exterior face of concrete block
- X. Scrape off mortar that may have dropped on brick course during parging of block wall
- Y. Lay six-course brick lead at both point A and point B (Figure 50)

FIGURE 50



- Z. Lay six courses of brick to mason's line (Figure 51)

FIGURE 51



JOB SHEET #5

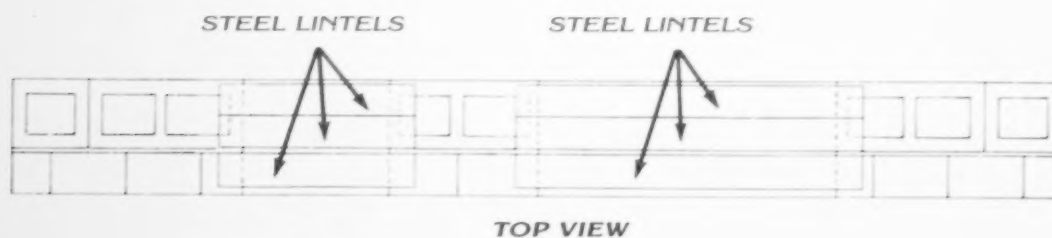
AA. Check window and door jambs to see if plumb

BB. Check mortar in joints; strike if necessary

CC. Place all lintels over tops of openings, keeping back of lintel tight against parging so that there will be enough room to lay brick across angle without cutting backs of brick

(NOTE: Make sure that there is equal bearing on jambs. See Figure 52.)

FIGURE 52



DD. Before laying fifth or last course of block, cut the five blocks to be laid on lintels

1. Place top or thick side of block down on table of masonry saw, lining it up square with blade and 2 inches outside of blade
2. Cut each web of block to a depth of 4 inches
3. Move block over and repeat procedure, keeping block on table and cutting webs the full length of block

CAUTION

Hold the block firmly with both hands and keep fingers away from blade. Wear goggles and dust respirator.

4. Tap cut webs gently with brick hammer so as not to fracture block
5. Cut four more blocks, using same procedure, but leaving last web on block

(NOTE: Only one block has to be cut the full length of block.)

JOB SHEET #5

EE. Lay fifth course of block

FF. Parge exterior face of blocks, and clean brick course of any mortar that may have dropped during parging

GG. Build three-course brick leads at points A and B

HH. Lay three courses of brick to mason's line

(NOTE: When laying the first course of brick on lintel or top of opening, do not place mortar on lintel.)

II. Strike all joints

JJ. Brush wall to remove all mortar burrs

KK. Restrike joints to first-class finish

LL. Have instructor evaluate wall

MM. Clean work area; clean and put away all tools and equipment



BRICKLAYING BASIC SKILLS
UNIT IV

JOB SHEET #6 — LAY BLOCK TO ESTABLISHED LEADS

I. Equipment and materials

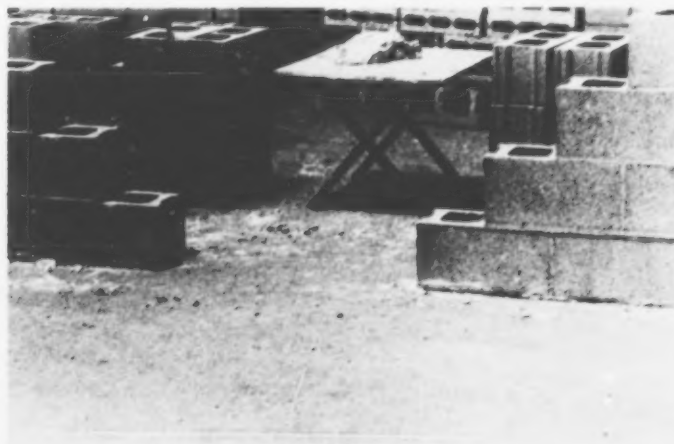
- A. Brick trowel
- B. Brick hammer
- C. Mortarboard and stand
- D. Modular rule
- E. Laboratory mortar
- F. 5-gallon pail
- G. Mason's line
- H. Line blocks
- I. Soft brush
- J. Shovel
- K. Approximately 50 8-inch blocks
- L. Jointer
- M. Heavy-duty marking pencil

II. Procedure

- A. Secure mason's line for first course using line blocks; make sure that line is tight and has no sag (Figure 53)

(NOTE: Use line pins or line holders if no corners are available.)

FIGURE 53



JOB SHEET #6

B. Spread mortar bed for blocks, keeping mortar about $\frac{3}{4}$ inch thick (Figure 54)

FIGURE 54



C. Apply mortar to block for head joint (Figures 55 and 56)

FIGURE 55



FIGURE 56



D. Pick up block and place gently on mortar bed, aligning end of block with dry bond marks on floor

JOB SHEET #6

- E. Apply pressure with hand, keeping top of block at top of mason's line and bottom face of block at chalk line on floor

(NOTE: Make sure that you can see daylight between face of block and line.)

- F. Place second block, using the same procedures used for previous block
- G. Cut off mortar at head and bed joints
- H. Lay closure block, or the last block to be laid to the line
1. Apply mortar to head joints of blocks laid to line; apply mortar to head joints of block to be laid (Figure 57)

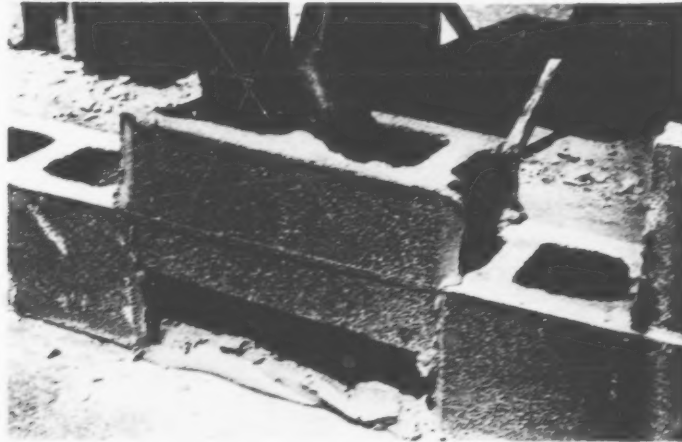
FIGURE 57



JOB SHEET #6

2. Pick up block and place it carefully so that mortar on head joints will not fall off (Figure 58)

FIGURE 58



I. Lay second course

1. Raise line blocks to second course, making sure that mason's line is even with top of block on lead

(NOTE: Make sure that line is tight and has no sag.)

2. Place mortar on face shells for second course (Figure 59)

FIGURE 59



JOB SHEET #6

3. Apply mortar to block for head joint
4. Pick up block and with a shoving motion place it gently on mortar bed, keeping a $\frac{3}{8}$ -inch head joint
5. Apply pressure to top of block, keeping top of block at top of line and bottom face of block on same plane as top face of the course below (Figure 60)

(NOTE: Be sure that you can see daylight between face of block and line.)

FIGURE 60



- J. Continue laying block to line, making sure block is on half bond, until you reach closure block, or last block to be laid to the line (Figure 61)

FIGURE 61



183



JOB SHEET #6

- K. Lay closure block, using same procedures used to lay closure block on first course (Figures 62 and 63)

(NOTE: Check the blocks laid to the line to make sure that they are in perfect alignment.)

FIGURE 62

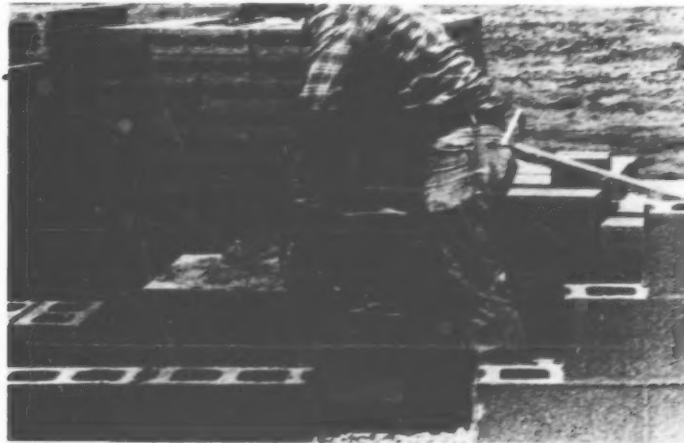
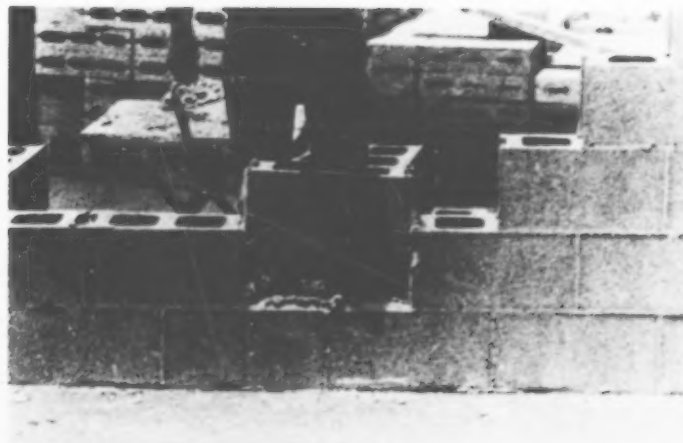


FIGURE 63



JOB SHEET #6

L. Continue laying blocks to height of leads

1. Make sure that line is tight and has no sag
2. Keep top of block at top of line and on same plane as course below
(NOTE: Be sure that you can see daylight between face of block and line.)
3. Remember to cut off mortar from head and bed joints on both sides of wall
4. Strike joints with concave jointer as needed (Figures 64 and 65)

FIGURE 64

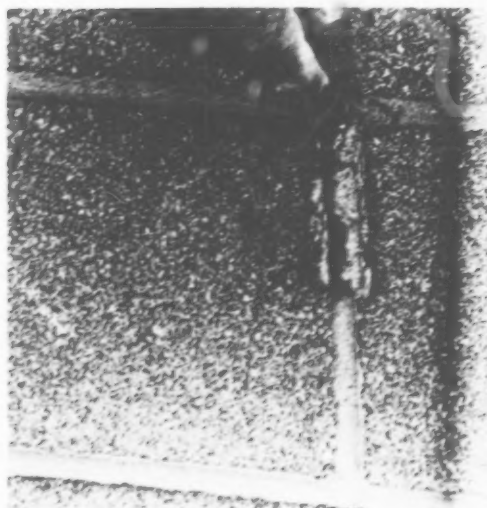


FIGURE 65



5. Clean units
 6. Restrike joints
- M. Clean up area around wall
- N. Have instructor inspect your work
- O. Clean and put away all tools and equipment

BRICKLAYING BASIC SKILLS
UNIT IV

JOB SHEET #7 — BUILD A 90-DEGREE BLOCK LEAD

I. Equipment and materials

- | | |
|------------------------------|--------------------------|
| A. Steel tape | J. Dusting brush |
| B. Bricklayer's modular rule | K. Story pole |
| C. Marking pencil | L. Mortarboard and stand |
| D. Chalk line | M. Laboratory mortar |
| E. Jointer | N. 5-gallon water bucket |
| F. Brick trowel | O. Water |
| G. Brick hammer | P. Square-point shovel |
| H. 4-foot level | Q. 42 blocks |

II. Procedure

(NOTE: The instructor should designate starting point.)

- A. Chalk wall lines on floor (Figure 66)

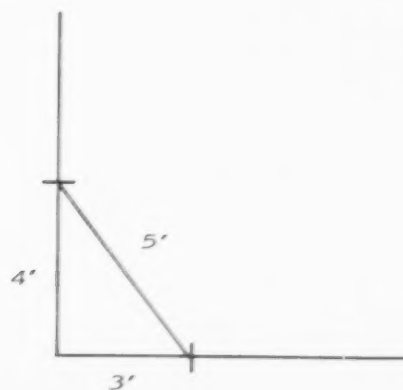
FIGURE 66



JOB SHEET #7

- B. With steel tape, check squareness of chalk lines using the 3' x 4' x 5' method (Figure 67)

FIGURE 67



- C. Have instructor evaluate
D. Lay out dry bond for wall (Figure 68)

FIGURE 68



JOB SHEET #7

E. Mark on floor location of ends of each block (Figure 69)

FIGURE 69



F. Remove dry bond by pushing blocks to outside so that there is enough room to lay corner leads

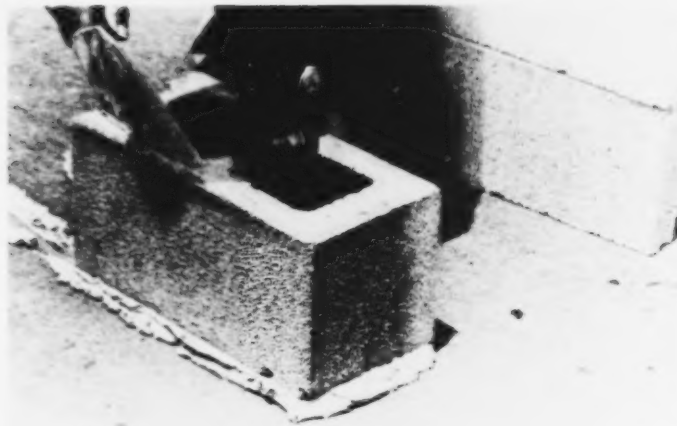
G. Lay first course of blocks for a five-course lead

1. Spread enough bed mortar for three blocks, keeping mortar about $\frac{3}{4}$ inch thick
2. Pick up a block and place it firmly on mortar bed
3. Apply slight pressure with hand, and make sure that bottom face of block is even with chalk lines on floor (See Figure 70)



JOB SHEET #7

FIGURE 70



4. Check height of block with modular rule
5. Level block
6. Apply mortar to second block for head joint (Figure 71)

FIGURE 71



JOB SHEET #7

7. Place second block gently on mortar bed, maintaining a $\frac{3}{8}$ -inch head joint and keeping bottom face of block even with chalk line on floor

(NOTE: Remember to cut off mortar from head and bed joints.)

8. Apply mortar for head joint and lay third block
9. Use 4-foot level to level blocks; check face of block for plumb and alignment (Figures 72 and 73)

FIGURE 72

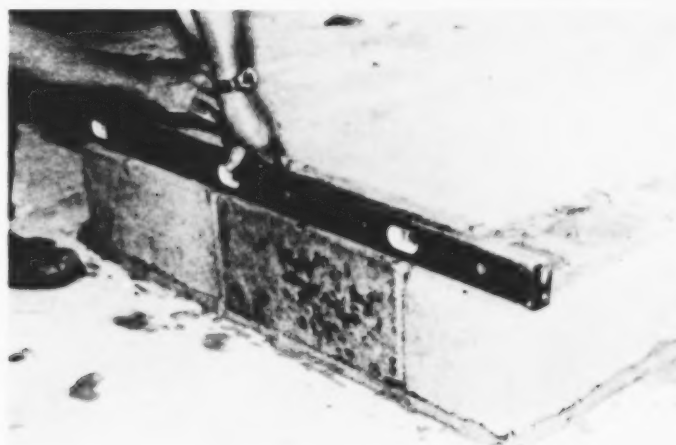


FIGURE 73



JOB SHEET #7

10. Use same procedures to spread mortar and lay blocks at return of lead

(NOTE: Be sure to keep head joints filled, blocks level, plumb, on course height, and even with chalk lines on floor.)

11. Strike joints if needed and clean up mortar on floor

- H. Start second block course by placing mortar on face shells; keep blocks level, plumb, aligned and on course height (Figures 74 and 75)

FIGURE 74

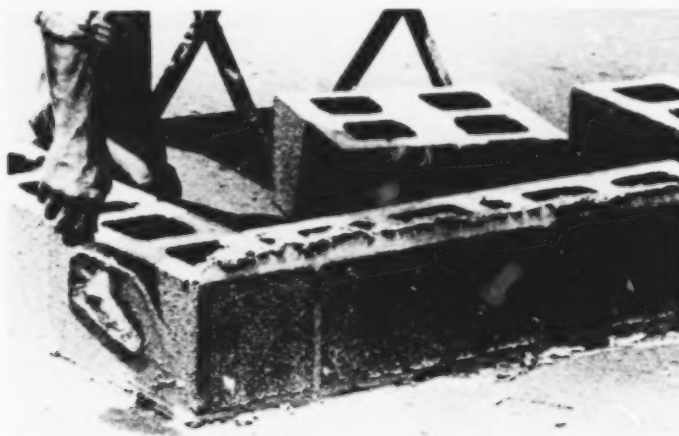


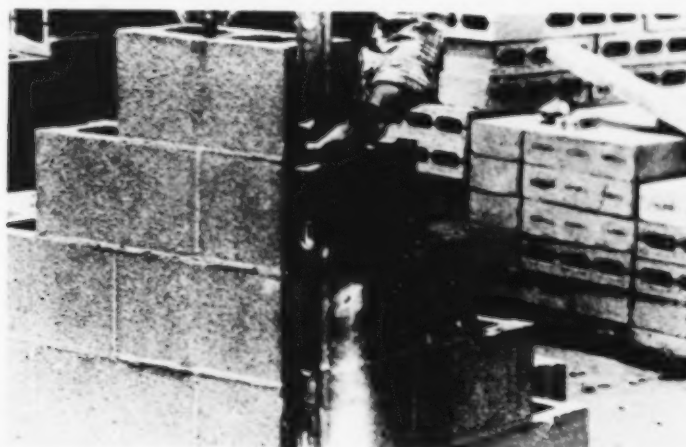
FIGURE 75



JOB SHEET #7

- I. Continue building lead to a height of five courses (40 inches) (Figure 76)

FIGURE 76



- J. Check level, plumb, alignment, rack, and course height of corner lead
- K. Strike, brush, and restrike joints
- L. Clean up floor at base of lead
- M. Have instructor inspect your work
- N. Clean and put away all tools and equipment

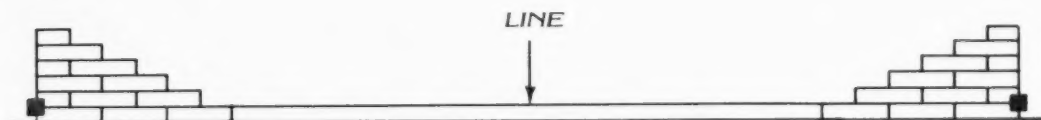


BRICKLAYING BASIC SKILLS
UNIT IV

JOB SHEET #8 — LAY BRICK TO ESTABLISHED LEADS

- I. Equipment and materials
 - A. Brick trowel
 - B. Brick hammer
 - C. Jointer
 - D. Mortarboard and stand
 - E. Shovel
 - F. Laboratory mortar
 - G. Bucket of water
 - H. Mason's line
 - I. Line blocks
 - J. Approximately 90 bricks
- II. Procedure
 - A. Lay out dry bond; mark on floor location of ends of each brick
 - B. Secure mason's line using line blocks; make sure that line is tight and has no sag (Figure 77)

FIGURE 77



JOB SHEET #8

C. Spread bed mortar for three or four bricks (Figure 78)

FIGURE 78



D. Pick up brick, and place enough mortar on end so that you will have a full head joint (Figure 79)

(NOTE: Make sure to keep ends of bricks even with dry bond marks on floor.)

FIGURE 79



JOB SHEET #8

- E. Apply pressure to top of brick, keeping top of brick even with top of line, and one thickness of the line away from the mason's line (Figure 80)

FIGURE 80



- F. Cut mortar off head joint and bed joint at base of brick, and place it on end of brick just laid

(NOTE: This is done for each brick laid to the line. See Figure 81.)

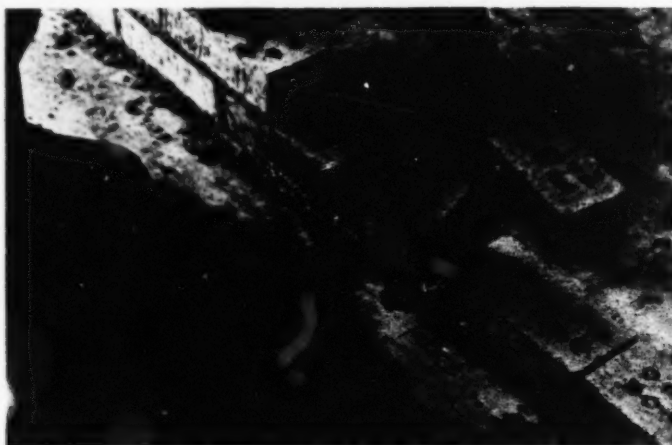
FIGURE 81



JOB SHEET #8

- G. Continue laying brick to the line until you come to the closure brick or last brick to be laid
- H. Lay closure brick
 - 1. Apply mortar to the ends of bricks already laid and both ends of brick to be laid (Figure 82)

FIGURE 82



- 2. Press brick firmly into place, keeping top of brick even with top of line (Figure 83)

(NOTE: Check bricks that have been laid to the line, making sure that tops of bricks are even with top of line and one thickness of the line away from the mason's line.)

FIGURE 83



JOB SHEET #8

- I. Raise line blocks for second course, making sure that line is even with top of brick on second course of leads
- J. Spread mortar for three or four bricks and continue to lay bricks to the line, making sure to half-bond bricks with those laid on first course (Figure 84)

FIGURE 84



(NOTE: The first two courses will establish the bond for the remaining courses to be laid. See Figure 85.)

FIGURE 85



JOB SHEET #8

- K. Raise line blocks for third course, making sure that line is tight and has no sag
1. Lay bricks on third course
 2. Sight end of each brick with end of corresponding brick on first course
- L. Continue to raise the line and lay brick to the line for the remaining courses (Figure 86)
1. Spread mortar for three or four bricks
 2. Make sure head joints are filled solid
 3. Keep top of bricks even with top of line
 4. Make sure that you can see daylight between face of brick and line
 5. Sight ends of brick with courses below to maintain a plumb bond
- (NOTE: Keep mortar well tempered.)

FIGURE 86



JOB SHEET #8

- M. Hold jointer firmly in hand and strike head joints; then strike bed joints (Figures 87 and 88)

(NOTE: The jointer should be slightly larger than the mortar joints.)

FIGURE 87



FIGURE 88



- N. Have instructor inspect your work
- O. Clean work area; clean and put away all tools and equipment



BRICKLAYING BASIC SKILLS
UNIT IV

JOB SHEET #9 — BUILD A 90-DEGREE BRICK LEAD

I. Equipment and materials

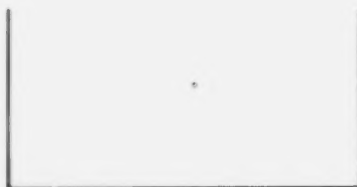
- A. Bricklayer's modular rule
- B. Brick trowel
- C. Brick hammer
- D. 4-foot level
- E. Dusting brush
- F. Concave jointer
- G. Shovel
- H. Framing square
- I. Chalk line
- J. Mortarboard and stand
- K. Laboratory mortar
- L. 5-gallon bucket
- M. Water
- N. 21 face bricks
- O. Story pole
- P. Marking pencil

II. Procedure

(NOTE: The instructor should designate starting point.)

- A. Chalk wall lines on floor (Figure 89)

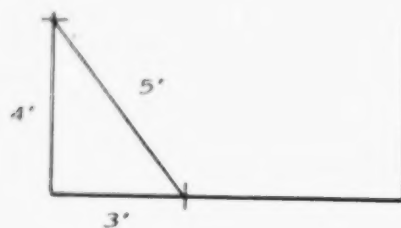
FIGURE 89



JOB SHEET #9

- B. With steel tape, check squareness of chalk lines using the 3' x 4' x 5' method (Figure 90)

FIGURE 90



- C. Have instructor evaluate
D. Lay out dry bond for wall (Figure 91)

FIGURE 91



JOB SHEET #9

E. Mark on floor location of ends of each brick (Figure 92)

FIGURE 92



F. Remove dry bond by pushing bricks to outside so that you have enough room to lay corner leads

G. Lay first course of bricks for a six-course lead

1. Spread enough bed mortar for three bricks
2. Pick up full brick and press it firmly on mortar bed, leaving a $\frac{3}{8}$ -inch bed joint, and keeping face and end of brick even with chalk line on floor (Figure 93)

FIGURE 93



JOB SHEET #9

3. Lay the two remaining bricks on lead by shoving brick into mortar and spreading enough mortar on end of brick to completely fill head joint (Figure 94)

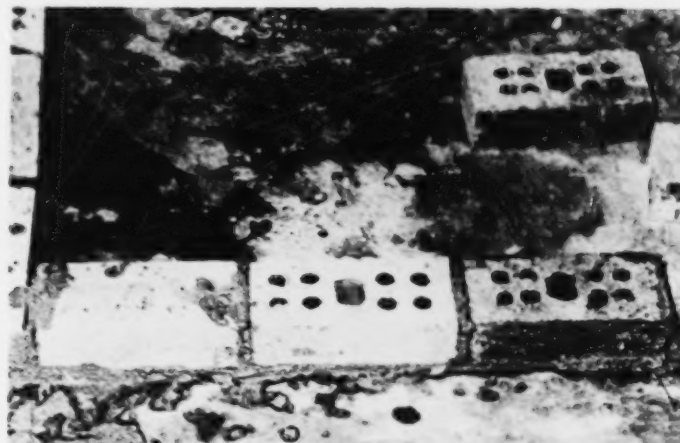
(NOTE: Remove mortar at base of bricks and make sure that bricks are even with chalk line and with dry bond marks on the floor.)

FIGURE 94



4. Spread mortar for three bricks at return of lead
5. Lay three bricks, keeping $\frac{3}{8}$ -inch bed joint and solid head joints (Figure 95)

FIGURE 95



JOB SHEET #9

6. Remove mortar at base of bricks

(NOTE: Make sure to align face of bricks with chalk line on floor.)

- H. Set level on top of course laid, and check for levelness (Figure 96)

(NOTE: If brick course is not level, tap brick slightly with trowel handle at high end.)

FIGURE 96



- I. Use story pole to check course height (Figure 97)

FIGURE 97



209

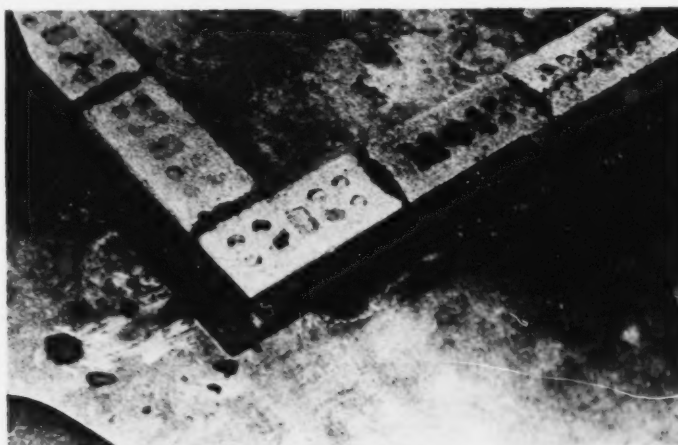


JOB SHEET #9

- J. Use framing square to check course squareness (Figure 98)

(NOTE: First course of lead should be flush with chalk lines and should be perfectly square.)

FIGURE 98



- K. Lay second course of lead

1. Spread mortar for three bricks in second course of lead

JOB SHEET #9

2. Lay bricks, keeping $\frac{3}{8}$ -inch bed joint and solid head joints, and keeping face of brick even with brick face of first course (Figures 99 and 100)

(NOTE: Be careful not to smear or stain face of bricks when cutting mortar from bed and head joints.)

FIGURE 99



FIGURE 100

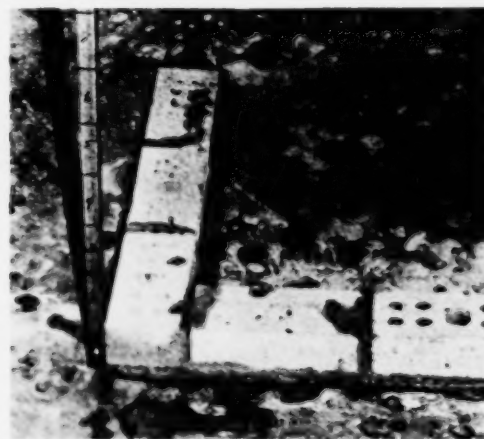


3. Spread mortar for two bricks in return of lead
 4. Lay two bricks, keeping $\frac{3}{8}$ -inch bed joint and solid head joints
- L. Level the course just laid; use story pole to check course height (Figures 101 and 102)

FIGURE 101



FIGURE 102



JOB SHEET #9

- M. Plumb corners on lead with level, making sure that they are perfectly plumb
- N. Lay third course
 - 1. Spread mortar for two bricks for third course
 - 2. Lay bricks, keeping face of bricks even with face of bricks on second course
 - 3. Spread mortar for two bricks in return of lead; keep $\frac{3}{8}$ -inch bed joint and make sure that head joints are filled solid
- O. Level course
- P. Check course height with story pole
- Q. Plumb corners
- R. Check range at both tails of lead (Figure 103)

FIGURE 103



JOB SHEET #9

S. Lay remaining three courses of lead, using same procedures used to lay first three courses

1. Keep head joints filled solid
2. Keep course level
3. Check course height with story pole
4. Make sure that corners are plumb and tails are on range (Figure 104)

(NOTE: For the last three courses on a lead, it is a good practice to sight the corner bricks that are going to be laid with the three courses that have been plumbed.)

FIGURE 104



- T. Have instructor inspect your work
- U. Clean work area; clean and put away all tools and equipment



BRICKLAYING BASIC SKILLS UNIT IV

TEST

NAME _____

SCORE _____

1. Match to their correct definitions terms associated with spreading mortar and laying block and brick. Write the correct numbers in the blanks. Definitions are continued on the following page.

- | | | |
|---------|---|-------------------------|
| _____a. | Vertical mortar joint between two units | 1. Furrow |
| _____b. | To remix mortar to proper consistency | 2. Level |
| _____c. | Consistency or density of mortar that is plastic and workable | 3. Bed joint |
| _____d. | Perfect vertical plane | 4. Spreading mortar |
| _____e. | Last unit laid in a course | 5. Laboratory mortar |
| _____f. | Slight indentation made in bed joint mortar | 6. Plumb |
| _____g. | Horizontal mortar joint between two units | 7. Ferrule |
| _____h. | Method of stepping back successive courses | 8. Temper |
| _____i. | Process of placing mortar for the course to be laid | 9. Block or brick leads |
| _____j. | To cause to conform to a specified grade; perfect horizontal plane | 10. Frog |
| _____k. | Relative mobility, or ability of fresh mortar to flow | 11. Closure |
| _____l. | Mixture of lime, sand, and water | 12. Mortar body |
| _____m. | Depression, such as a groove or recess, in one or both of the larger sides of a brick or block; provides key for mortar at joints | 13. Racking back |
| | | 14. Head joint |
| | | 15. Deadman |
| | | 16. Consistency |



TEST

- ____n. Metal cap around handle of brick trowel at shank end
- ____o. Object to which the line is attached for lead or first course
- ____p. Sections of wall built up and racked back on successive courses; used to attach line as guide for constructing wall between them

2. Describe the correct way to hold a brick trowel.

- a. _____
- b. _____
- c. _____
- d. _____

3. Label methods of picking up mortar from mortarboard.



- a. _____
- _____



- b. _____
- _____

TEST

4. Arrange in order procedures used to pick up mortar. Write a "1" in the blank before the first procedure, a "2" before the second procedure, and so on.
- _____a. Hold trowel flat against mortarboard, and slide it forward under the small pile of mortar
 - _____b. Use a rolling motion to move the mortar to edge of mortarboard
 - _____c. Use a downward slicing motion of trowel to separate a portion of mortar from main pile
 - _____d. While pushing forward, lift mortar with an upward motion of trowel
 - _____e. Use trowel to work mortar into a long, tapered shape
5. Describe why wrist is snapped when picking up mortar.
- _____
- _____
6. Explain direction of travel for placing mortar.
- a. Right-handed person
 - 1. _____
 - 2. _____
 - b. Left-handed person
 - 1. _____
 - 2. _____
7. Arrange in order procedures for placing mortar. Write a "1" in the blank before the first procedure, a "2" before the second procedure, and so on.
- _____a. Keep elbow slightly away from body
 - _____b. Load trowel
 - _____c. Fill any spaces in bed joint with excess mortar
 - _____d. Use a sweeping motion to spread mortar



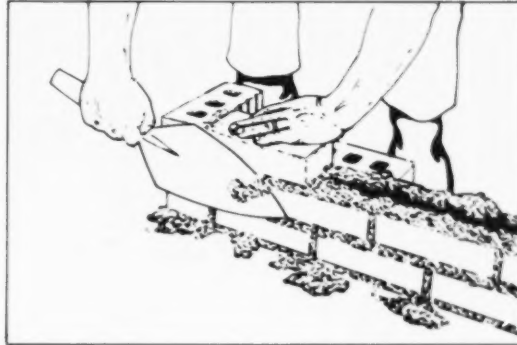
TEST

8. Identify direction of travel for laying brick or block. Write the correct answers in the blanks.

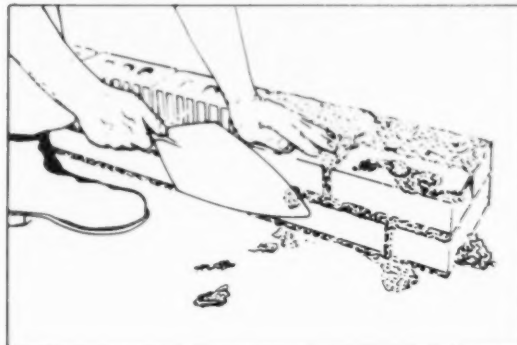
Laying to hand

Laying backhand or against hand

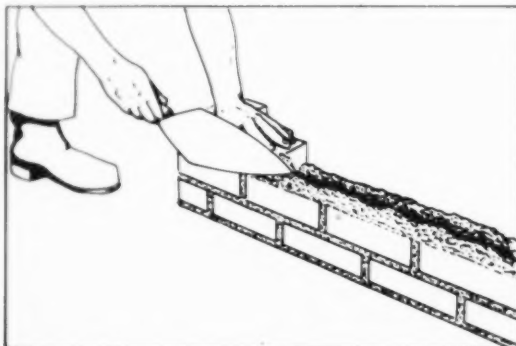
Laying overhand



a. _____



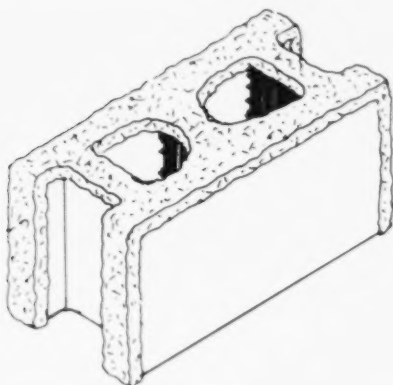
b. _____



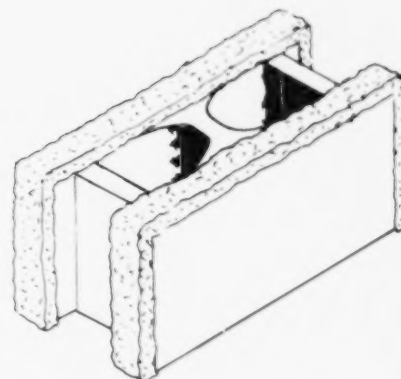
c. _____

TEST

9. Label the following types of bedding.



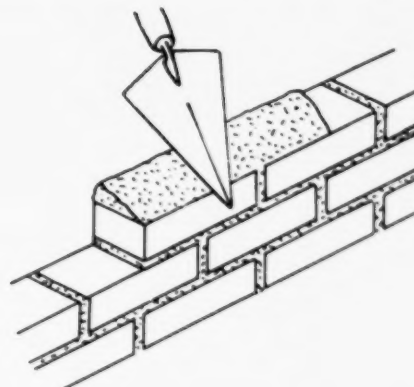
a. _____



b. _____



c. _____



d. _____

10. State two purposes of the frog.

a. _____

b. _____

11. Select from the following list basic skills used in masonry work. Write an "X" in the blank before each correct answer.

____ a. Striking mortar joints with brick hammer

____ b. Plumbing masonry units

____ c. Cutting masonry units with skill saw



TEST

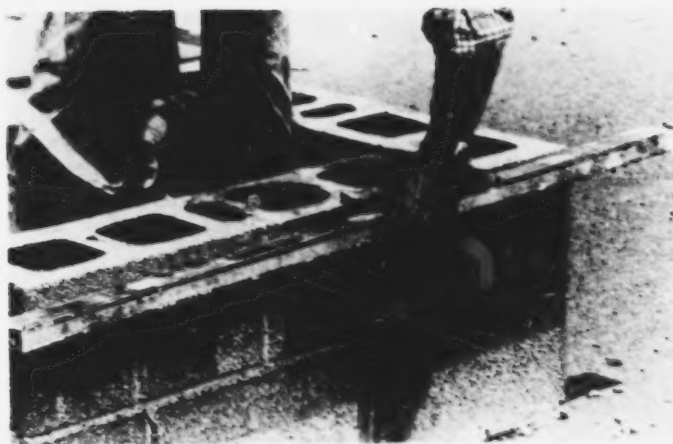
- ____d. Spreading mortar with brick trowel
- ____e. Checking course height with a modular rule
- ____f. Applying head joints to masonry
- ____g. Leveling masonry courses
- ____h. Cutting reinforcing steel with hammer and brick set
- ____i. Brushing wall and striking joints
- ____j. Checking alignment

12. Label the following methods used to align masonry units.



a. _____

TEST



b. _____

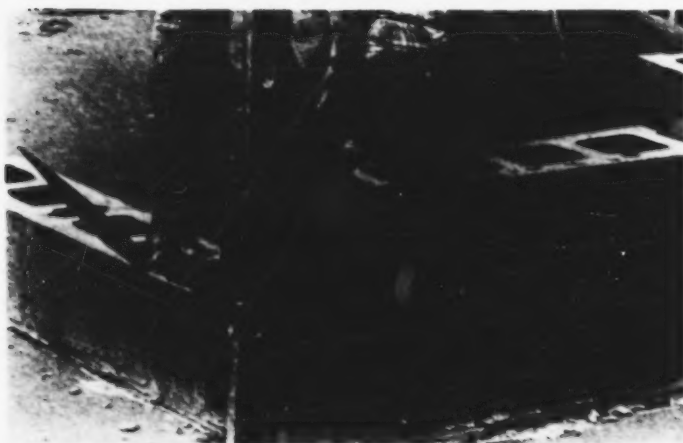


c. _____

220



TEST



d. _____



e. _____

13. State five bricklaying safety rules.

a. _____

TEST

- b. _____

- c. _____

- d. _____

- e. _____

(NOTE: Test item 14 lists the job sheets. They are an important part of this test. If they have not been completed, check with your instructor.)

14. Demonstrate the ability to
- a. Measure, mark and cut brick and block.
 - b. Spread mortar on a two-by-four.
 - c. Swipe mortar on a two-by-four for block.
 - d. Construct a section of wall.
 - e. Construct a section wall with openings.
 - f. Lay block to established leads.
 - g. Build a 90-degree block lead.
 - h. Lay brick to established leads.
 - i. Build a 90-degree brick lead.



BRICKLAYING BASIC SKILLS UNIT IV

ANSWERS TO TEST

1. a. 14 e. 11 i. 4 m. 10
 b. 8 f. 1 j. 2 n. 7
 c. 12 g. 3 k. 16 o. 15
 d. 6 h. 13 l. 5 p. 9

2. Description should include the following.
 - a. Place fingers at bottom of handle
 - b. Place thumb on top of ferrule, pointing toward point of blade
 - c. Hold handle firmly, but with a relaxed grip
 - d. Apply pressure between thumb and forefinger

3. a. Clock method (from the middle of mortarboard)
 b. Cupping method (from the side of mortarboard)

4. a. 4 d. 5
 b. 2 e. 3
 c. 1

5. To set mortar on the trowel to keep it from falling off

6. a. Right-handed person
 1. Spreads left to right
 2. Moves backwards
 b. Left-handed person
 1. Spreads right to left
 2. Moves backwards

7. a. 2 c. 4
 b. 1 d. 3

8. a. Laying overhand
 b. Laying backhand or against hand
 c. Laying to hand



ANSWERS TO TEST

9.
 - a. Full mortar
 - b. Face shell
 - c. Furrowed
 - d. Tapered or beveled
10. Answer should include any two of the following.
 - a. Locks mortar into recess for better grip
 - b. Creates special effects when bricks are laid on their sides
 - c. Saves cost of materials
11. b, d, e, f, g, i, j
12.
 - a. Checking course height
 - b. Checking alignment (in-line)
 - c. Leveling
 - d. Plumbing
 - e. Racking or tailing a lead
13. Answer should include any five of the following.
 - a. Always cut masonry away from other workers
 - b. Wear proper protective clothing and safety equipment when using masonry saw
 - c. Always replace mortar carefully on mortarboard or in tub; *never* throw it so that it will splash
 - d. Keep tools out of path of other people
 - e. Always hand tools or materials to other person; *never* throw them
 - f. Use proper tool for job, and practice good tool habits as skills are learned
 - g. Lift heavy objects properly
 - h. Follow OSHA regulations
14. Performance skills evaluated to the satisfaction of the instructor.